



# **NAVAL POSTGRADUATE SCHOOL**

**MONTEREY, CALIFORNIA**

Physical, Nutrient, and Biological Measurements of  
Coastal Waters off Central California in June 2007

by

Thomas A. Rago, Reiko Michisaki, Baldo Marinovic, Marguerite Blum, and  
Katherine Whitaker

October 2007

**Approved for public release; distribution is unlimited.**

Prepared for: Marine Sciences Institute,  
University of California, Santa Cruz

THIS PAGE INTENTIONALLY LEFT BLANK

NAVAL POSTGRADUATE SCHOOL

Monterey, California 93943

Daniel T. Oliver  
**President**

Leonard A. Ferrari  
**Provost**

This report was prepared for and funded by: Marine Sciences Institute, University of  
California, Santa Cruz.

Reproduction of all or part of this report is authorized.

This report was prepared by:

---

THOMAS A. RAGO  
**Oceanographer**

---

REIKO MICHISAKI  
**Oceanographer**

---

BALDO MARINOVIC  
**Research Biologist**

---

MARGUERITE BLUM  
**Oceanographer**

---

KATHERINE WHITAKER  
**Marine Mammal Observer**

Reviewed by:

Released by:

---

CURTIS A. COLLINS  
**Professor/Principal Investigator**  
**Dept. of Oceanography**

---

MARY L. BATTEEN  
**Professor and Chairman**  
**Dept. of Oceanography**

---

DAN C. BOGER  
**Interim Associate**  
**Provost and Dean of**  
**Research**

THIS PAGE INTENTIONALLY LEFT BLANK

<b>REPORT DOCUMENTATION PAGE</b>			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.				
<b>1. AGENCY USE ONLY (Leave blank)</b>		<b>2. REPORT DATE</b> October 2007	<b>3. REPORT TYPE AND DATES COVERED</b> Technical Report, June 2007	
<b>4. TITLE AND SUBTITLE:</b> Title (Mix case letters) Physical, Nutrient, and Biological Measurements of Coastal Waters off Central California in June 2007.			<b>5. FUNDING NUMBERS</b>	
<b>6. AUTHOR(S)</b> Thomas A. Rago, Reiko Michisaki, Baldo Marinovic, Marguerite Blum, and Katherine Whitaker				
<b>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</b> Naval Postgraduate School Monterey, CA 93943-5000			<b>8. PERFORMING ORGANIZATION REPORT NUMBER</b> NPS-OC-07-008	
<b>9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)</b> Marine Sciences Institute, University of California, Santa Cruz			<b>10. SPONSORING / MONITORING AGENCY REPORT NUMBER</b>	
<b>11. SUPPLEMENTARY NOTES</b> The views expressed in this technical report are those of the authors and do not reflect the official policy or position of the Department of Defense or the U.S. Government.				
<b>12a. DISTRIBUTION / AVAILABILITY STATEMENT</b> Approved for public release; distribution is unlimited.			<b>12b. DISTRIBUTION CODE</b>	
<b>13. ABSTRACT (maximum 200 words)</b>  The results of analyses of hydrographic, nutrient, and biological data collected in coastal ocean waters off Central California in June 2007 aboard the <i>NOAA Ship McArthur-II</i> are presented in both tabular and graphical form. The cruise departed from and returned to San Francisco, California, proceeding from Point Reyes, California, along CalCOFI line 60 to station 90, thence to CalCOFI line 67/station 90, and finally along CalCOFI line 67 and along the shelf break to off San Francisco. Marine mammal observations taken during the cruise are also included.				
<b>14. SUBJECT TERMS</b> hydrography, physical oceanography, biological oceanography, nutrients, zooplankton, marine mammals, PaCOOS, CalCOFI			<b>15. NUMBER OF PAGES</b> 87	
			<b>16. PRICE CODE</b>	
<b>17. SECURITY CLASSIFICATION OF REPORT</b> Unclassified	<b>18. SECURITY CLASSIFICATION OF THIS PAGE</b> Unclassified	<b>19. SECURITY CLASSIFICATION OF ABSTRACT</b> Unclassified	<b>20. LIMITATION OF ABSTRACT</b> UU	

THIS PAGE INTENTIONALLY LEFT BLANK

## Contents

List of Tables	ii
List of Figures	iii
Introduction	1
Standard Procedures	1
CTD/Rosette Data	1
Zooplankton Net Tows	3
Marine Mammal Observations	7
Ancillary Observations	8
Tabulated Data ( <i>in Appendix A</i> )	8
Figures of Results ( <i>in Appendix B</i> )	9
Cruise Participants	9
Literature Cited	10
Appendix A	12
Table A1	12
Table A2	13
Table A3	33
Table A4	69
Appendix B	71
Figure 6	71
Figure 7	72
Figure 8	73
Figure 9	74
Figure 10	75
Initial Distribution List	76

### **List of Tables**

Table 1:	Zooplankton Data.	4
Table A1:	Meteorological and sea surface data collected during the PaCOOS cruise of June 2007.	11
Table A2:	List at standard pressures of hydrographic data collected during the PaCOOS cruise of June 2007.	13
Table A3:	Results of nutrient and primary productivity analyses of water samples collected at each hydrographic station during the PaCOOS cruise of June 2007.	33
Table A4:	Marine Mammal Observations.	69



## List of Figures

Figure 1:	Full CalCOFI hydrographic station grid.	2
Figure 2:	Hydrographic stations occupied during the PaCOOS cruise of June 2007.	2
Figure 3:	Biovolume displacement values for CalCOFI lines 67 and 60 collected during June 2007.	5
Figure 4:	Mean abundance for CalCOFI lines 67 and 60 of the species <i>Euphausia pacifica</i> collected during June 2007.	6
Figure 5:	Mean abundance for CalCOFI lines 67 and 60 of the species <i>Nematoscelis difficilis</i> collected during June 2007.	7
Figure 6:	Contours of <b>(a)</b> temperature ( $^{\circ}\text{C}$ ), <b>(b)</b> salinity, <b>(c)</b> density anomaly ( $\text{kg m}^{-3}$ ), and <b>(d)</b> oxygen ( $\mu\text{m kg}^{-1}$ ) fields along the line of hydrographic stations from Moss Landing (on the left) to Point Reyes, California.	71
Figure 7:	Contours of fluorescence (volts) [upper panel] and transmissivity (percentage) [lower panel] in the upper 100 dbars of the water column along the line of hydrographic stations from Moss Landing (on the left) to Point Reyes, California.	72
Figure 8:	Contours of <b>(a)</b> nitrate ( $\mu\text{m}$ ), <b>(b)</b> nitrite ( $\mu\text{m}$ ), <b>(c)</b> phosphate ( $\mu\text{m}$ ), and <b>(d)</b> silicate ( $\mu\text{m}$ ) fields along the line of hydrographic stations from Moss Landing (on the left) to Point Reyes, California.	73
Figure 9:	Locations of sightings of all marine mammals during the PaCOOS cruise of June 2007.	74
Figure 10:	AVHRR (Advanced Very High Resolution Radiometer) satellite image of sea surface temperature ( $^{\circ}\text{C}$ ) of the area of operation during the PaCOOS cruise of June 2007.	75

## **Introduction**

Following in a long tradition of hydrographic studies of the California Current system-- see, for example, Steger et al. (2000) and Collins et al. (2003)-- the data in this report were collected during the 4-9 June 2007 cruise of the Pacific Coast Ocean Observing System (PaCOOS) program aboard the *NOAA Ship McArthur-II*. The PaCOOS program was organized in 2003/2004 as the NOAA west coast contribution to the national Integrated Ocean Observing System (IOOS), and is charged with “providing the ocean information needed for the sustained use of fishery resources and protection of marine species and their ecosystem under a changing climate.”<sup>1</sup> PaCOOS cruises generally subsample the standard California Cooperative Oceanic Fisheries Investigations (CalCOFI) grid of hydrographic stations (Figure 1). With a slight exception, this cruise did exactly that, sampling along CalCOFI line 60 from Point Reyes, California, to station 90 (CTD casts 1-12), southeast to CalCOFI line 67/station 90 (CTD casts 17/18), then shoreward to Moss Landing, California, along CalCOFI line 67, and finally northwest along the continental Shelf edge to offshore of San Francisco, California (Figure 2). The exception was that, to increase the resolution of the hydrographic data and to maintain the convention of similar recent PaCOOS cruises (Rago et al., 2006, 2007a, 2007b), eight CTD casts were inserted between the standard CalCOFI sites along line 67. Primary productivity and zooplankton analyses were not performed at these added sites. Participants on the cruise came from the Naval Postgraduate School (Physical Oceanography and Marine Mammal Observations), the Monterey Bay Aquarium Research Institute (Nutrient Analysis and Primary Productivity), the University of California at Santa Cruz (Zooplankton Analysis), and the *Teacher at Sea* Program<sup>2</sup>.

The CTD data can be found in the NODC data archive using accession number 0034511.

## **Standard Procedures**

### *CTD/Rosette Data:*

At each site a Seabird Electronics, Inc., Conductivity-Temperature-Depth (CTD) instrument fitted with a 12-place rosette was deployed. The rosette was equipped with 12 10-liter PVC Niskin bottles for collection of water samples. The CTD was generally lowered to 1000 meters or the bottom (whichever came first), except that casts were extended to the full ocean depth at CTD stations 13 (4547 dbar) and 18 (4460 dbar). Where primary productivity sampling was performed, water samples were taken at depths designed to maximize resolution of the variables sampled throughout the thermocline. Where only nutrient sampling was performed<sup>3</sup>, water samples were more or less evenly spaced throughout the water column. A water sample was always obtained at or near the bottom of each CTD cast for later conductivity/salinity calibration of the CTD conductivity sensors.

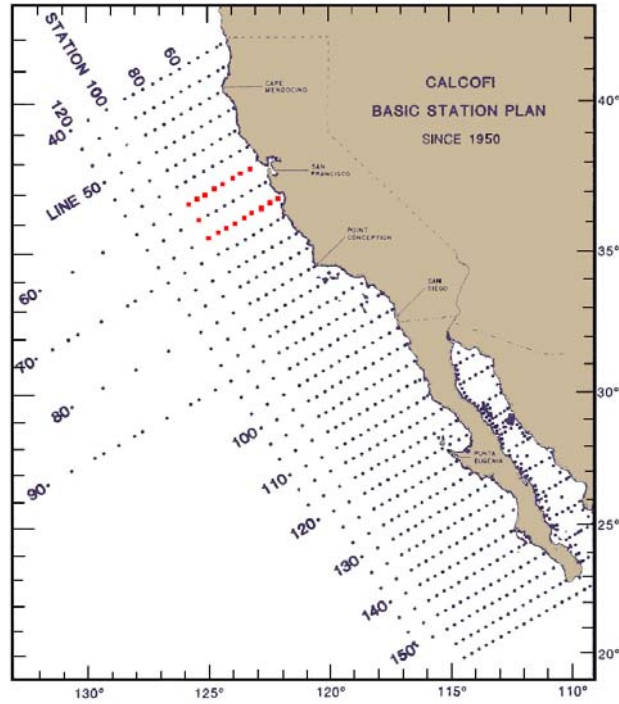
Besides temperature (dual sensors), conductivity (dual sensors), and pressure, the CTD also measured fluorescence, transmissivity, dissolved oxygen content, and photosynthetically available radiation (PAR) in the water column. Except for PAR and the secondary of the dual sensors, all these parameters are reported here.

---

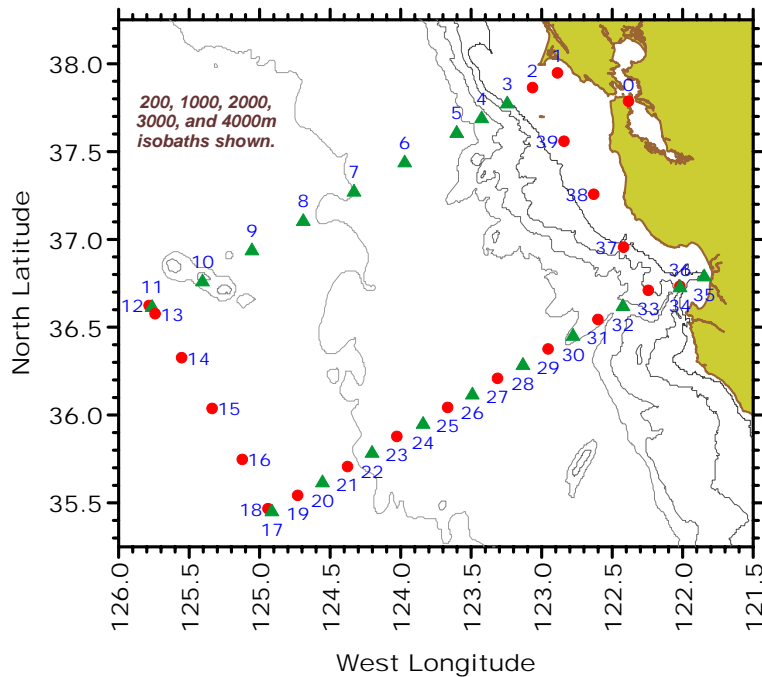
<sup>1</sup> <http://www.pacoos.org/Pages/history.htm>

<sup>2</sup> <http://teacheratsea.noaa.gov>

<sup>3</sup> CTD stations 4, 13, 18, 19, 21, 23, 25, 27, 29, 31, 33, and 36-39.



**Figure 1:** Full CalCOFI hydrographic station grid. Stations occupied during the PaCOOS cruise of June 2007 are highlighted in red.



**Figure 2:** Hydrographic stations occupied during the PaCOOS cruise of June 2007. 200, 1000, 2000, 3000, and 4000 m isobaths are shown. CTD 0 was done at the pier in San Francisco. Net tows were completed at the CTD sites marked by green triangles.

Generally, a minimum of two salinity samples (including the bottom-of-cast sample) were collected from each CTD cast. These samples were analyzed after the cruise at the Naval Postgraduate School (NPS) using a Guildline model 8400B Autosol salinometer. A regression between the salinometer results and the conductivities measured by the CTD at the times the Niskin bottles were tripped was made, from which a correction to the CTD salinities was determined and then applied. The salinometer was standardized using IAPSO Standard Seawater (batch P147) before and after each set of water samples was analyzed. Salinity values were calculated using the algorithms for the Practical Salinity Scale, 1978 (UNESCO, 1981).

Dissolved oxygen (Winkler) samples were collected at CTD stations 11, 13, 17, 18, 20, 26, 30, 32, and 35-37. These were analyzed after the cruise at the Monterey Bay Aquarium Research Institute (MBARI). The CTD for this cruise was outfitted with a Sea-Bird Electronics, Inc., SBE 43 oxygen sensor. This sensor is a polarographic membrane that outputs a voltage proportional to the temperature-compensated current flow occurring when oxygen is reacted inside the membrane. Dissolved oxygen concentration is then calculated from a modified version of the algorithm by Owens and Millard (1985). The results of the analysis of the Winkler oxygen samples were compared to the corresponding oxygen values recorded by the CTD. Using the method described in SBE Application Note #64-2<sup>4</sup>, we calculated new SBE 43 sensor coefficients. Corrected CTD oxygen values were then recalculated with the modified version of the Owens and Millard (1985) algorithm using the new sensor coefficients.

Nutrient samples were collected in 45-ml polypropylene screw-capped containers which were rinsed three times prior to filling. Samples were frozen and returned to MBARI for later analysis on an AlpChem autoanalyzer, as in Sakamoto et al. (1990).

Chlorophyll-*a* and phaeopigments were collected in 280-ml polyethylene bottles and filtered onto 25-mm Whatmann GF/F filters. Chlorophyll-*a* was assayed with the standard fluorometric procedure of Holm-Hansen et al. (1965), modified such that phaeopigments are extracted in acetone in a freezer over at least 24 hours (Venrick and Hayward, 1984; Chavez et al., 1991). Analysis was performed as possible during the cruise or at MBARI immediately following the cruise.

Primary productivity was estimated for the 100, 50, 15, 5, 1, and 0.1% light penetration depths as determined by secchi, and followed the general method of Parsons et al. (1984). Water samples from the appropriate depths were collected in 280-ml polycarbonate bottles, spiked with <sup>14</sup>C, and incubated on deck for 24 hours under running seawater in plexiglass tubes wrapped with nickel-cadmium screens of differing pore size. (See Pennington and Chavez, 2000, for methodology details.)

### *Zooplankton Net Tows:*

Nineteen stations<sup>5</sup> (Figure 2 and Table1) were sampled for zooplankton during the cruise. All sampling was conducted with 0.7-m diameter paired bongo nets fitted with 505-mm mesh, which were towed obliquely to a depth of 210 m (or within 10 m of the bottom, whichever came first). Samples were preserved at sea according to standard protocols (Kramer et al., 1972). Upon return to the University of California at Santa Cruz (UCSC), all samples were initially measured for total biovolume and subsequently processed for krill species composition and abundance.

---

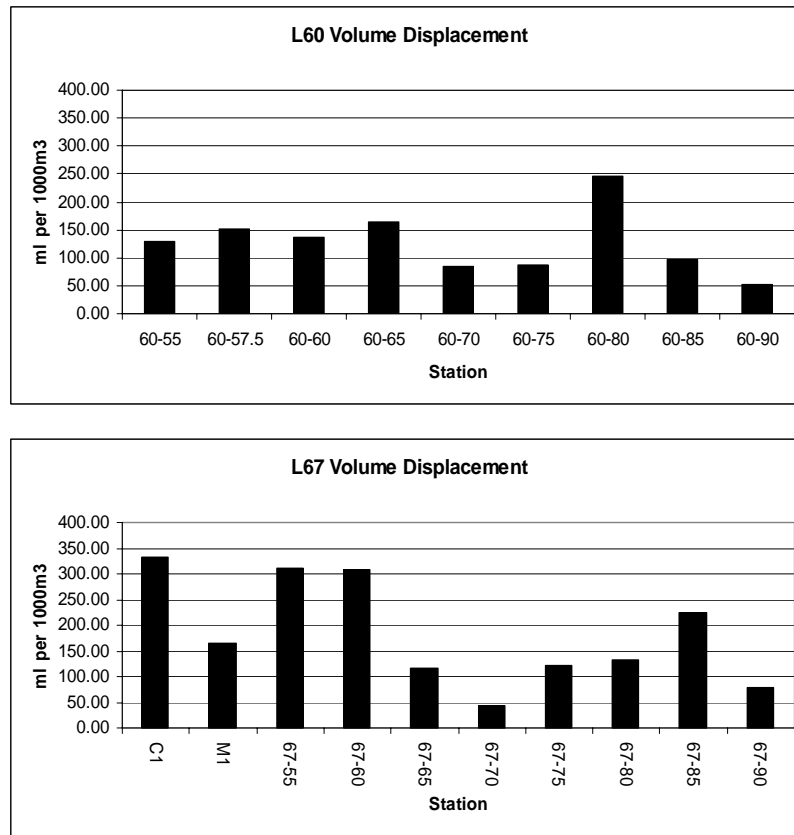
<sup>4</sup> [http://www.seabird.com/pdf\\_documents/ApplicationNotes/Appnote64-2Aug05.pdf](http://www.seabird.com/pdf_documents/ApplicationNotes/Appnote64-2Aug05.pdf)

<sup>5</sup> CTD stations 3-11, 17, 20, 22, 24, 26, 28, 30, 32, 34, and 35.

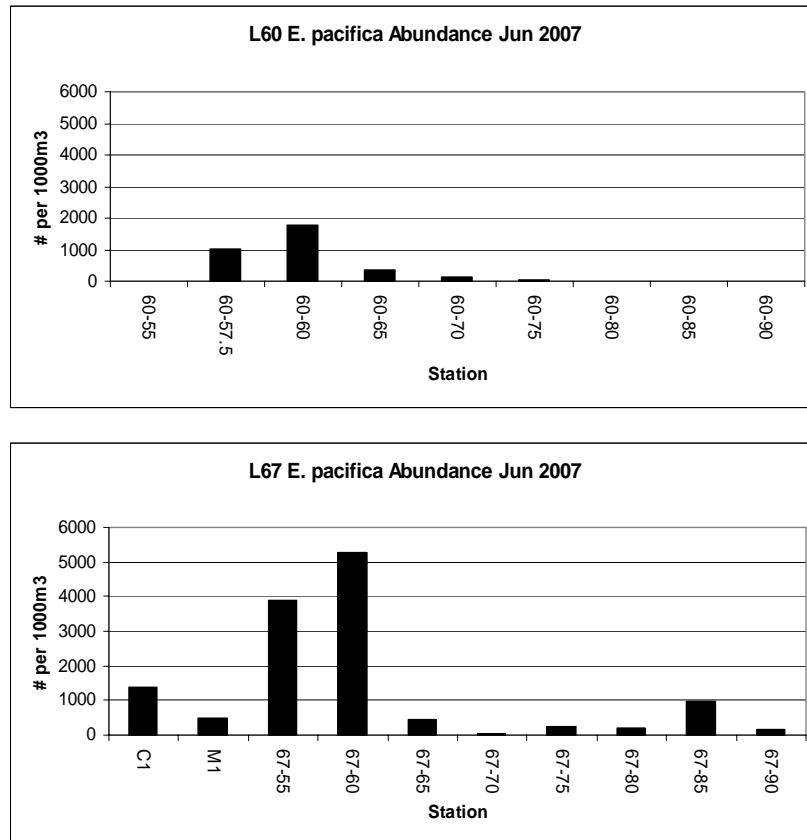
**Table 1:** *Zooplankton Data.* This table lists the total biovolume abundance, as well as the mean abundance of the three dominant euphausiid species (*Euphausia pacifica*, *Thysanoessa spinifera*, and *Nematoscelis difficilis*), measured at the nineteen hydrographic stations—10 on CalCOFI line 67, 9 on CalCOFI line 60— where bongo net tows were completed during the PaCOOS cruise of June 2007. The data are listed by CalCOFI line, onshore to offshore and south to north.

Station ( <i>CalCOFI</i> ) Number	Zooplankton Biovolume (ml/1000m <sup>3</sup> )	<i>E. pacifica</i> Abundance (no./1000m <sup>3</sup> )	<i>T. spinifera</i> Abundance (no./1000m <sup>3</sup> )	<i>N. difficilis</i> Abundance (no./1000m <sup>3</sup> )
35 (67-C1)	333.46	1.36	0.00	0.12
34 (67-M1)	165.86	0.51	0.00	0.07
32 (67-55)	309.95	3.91	0.00	0.00
30 (67-60)	308.64	5.27	0.00	0.23
28 (67-65)	115.99	0.44	0.00	0.08
26 (67-70)	42.97	0.03	0.03	0.00
24 (67-75)	122.23	0.25	0.00	0.02
22 (67-80)	132.19	0.18	0.00	0.19
20 (67-85)	223.10	0.95	0.00	1.95
17 (67-90)	79.57	0.15	0.00	0.04
3 (60-55)	129.53	0.01	0.00	0.01
4 (60-57.5)	152.42	1.02	0.00	0.02
5 (60-60)	137.55	1.76	0.06	0.02
6 (60-65)	164.96	0.36	0.00	0.33
7 (60-70)	84.10	0.13	0.00	0.07
8 (60-75)	88.13	0.04	0.00	0.04
9 (60-80)	245.72	0.01	0.00	0.06
10 (60-85)	96.19	0.00	0.00	0.07
11 (60-90)	52.39	0.02	0.00	0.02

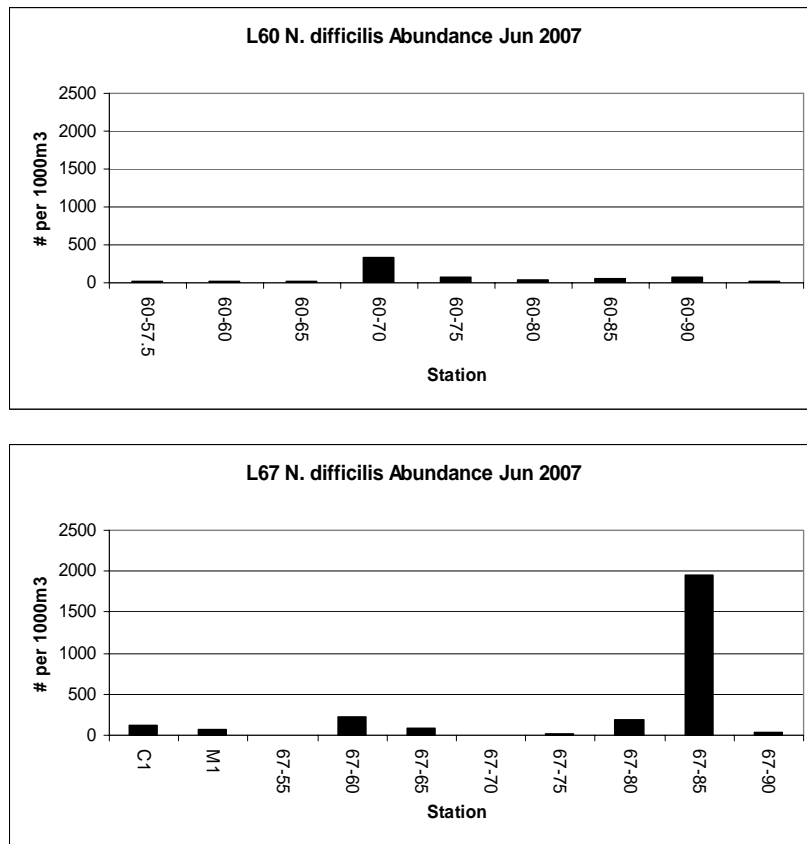
Patterns of zooplankton and krill distribution and abundance differed somewhat between CalCOFI lines 60 and 67. Zooplankton abundance, as inferred from volume displacement, was on average higher and had a more onshore distribution along line 67 than along line 60 (Figure 3). The overall abundances of the two most numerically dominant species of krill, *Euphausia pacifica* and *Nematoscelis difficilis*, were also higher along line 67. However, both species exhibited similar patterns of distribution along both of the CalCOFI lines, with *E pacifica* demonstrating a more onshore, and *N difficilis* a more offshore, distribution (Figures 4 and 5, respectively).



**Figure 3:** Biovolume displacement values for CalCOFI lines 67 (lower) and 60 (upper) collected during June 2007.



**Figure 4:** *Mean abundance for CalCOFI lines 67 (lower) and 60 (upper) of the species Euphasia pacifica collected during June 2007.*



**Figure 5:** Mean abundance for CalCOFI lines 67 (lower) and 60 (upper) of the species *Nematoscelis difficilis* collected during June 2007.

#### *Marine Mammal Observations:*

Observations of marine mammals (Figure 9 and Table A4) were made by a single observer during daylight hours (approximately 1300 to 0300 Coordinated Universal Time [UT]) throughout the cruise, conditions permitting (e.g., clear or high clouds, Beaufort state less than 4, etc.). Observations were made from the 04-deck (above the Bridge), where eye height was approximately 20 meters above the sea surface, using handheld Fujinon 7 x 50 binoculars with compass for bearing and reticle for distance. Observations were recorded on a laptop computer using the marine mammal and bird mapping program *Seebird* (developed at the Southwest Fisheries Science Center). This program interfaces with handheld global positioning system (GPS) devices, and allows the generation of observation logs containing the observations of the mammals themselves with matching ship's velocities and positions, observational conditions, etc. Generally, intensive "on effort" observations were made during the last half of each half-hour period, with the other half of the half-hour period devoted to less intensive "off effort" observations. Depending on the situation, the observer would take short breaks from the observations approximately every two hours.



### *Ancillary Observations:*

*Underway Data:* Near surface measurements of temperature and salinity were recorded throughout the cruise from water pumped through the ship's uncontaminated seawater system. These data, along with meteorological data (barometric pressure, wind, etc.) collected from various sensors mounted primarily on the ship's mast, were recorded at approximately 30-second intervals throughout the cruise. Table A1 lists these data at the start of each hydrographic station.

*Satellite Imagery:* AVHRR (Advance Very High Resolution Radiometer) satellite imagery of sea surface temperature of the area of operation during the PaCOOS cruise for those times when conditions were sufficiently clear is included in Figure 10.

### **Tabulated Data (in Appendix A)**

The following tables of data follow in Appendix A:

1) *Table A1: Meteorological and Sea Surface Data*

This lists the meteorological and surface oceanographic conditions at the start of each hydrographic station.

2) *Table A2: Hydrographic Data*

This is a chronological listing of the hydrographic data collected at each CTD station during the cruise. Data are given for standard pressures, except that the last line of data for each site is the deepest pressure for that CTD cast. The surface pressure, listed as 0 dbar, is actually 1 dbar. Salinities (oxygen) have been adjusted according to the conductivity/salinity (oxygen) calibration correction determined from the collected salinity (oxygen/Winkler) water samples. The time listed for each station is the beginning (UT) of the CTD cast. Units of geopotential anomaly ( $\Delta\Phi$ ), potential density ( $\sigma_\theta$ ), and potential spiciness ( $\pi_\theta$ ) are  $\text{m}^2\text{s}^{-2}$ ,  $\text{kg m}^{-3}$ , and  $\text{kg m}^{-3}$ , respectively.

3) *Table A3: Nutrient and Primary Productivity Data*

This is a chronological listing of the results of the nutrient and primary productivity analyses of the water samples collected from the 12 Niskin bottles tripped at each hydrographic station. The time given is the start (UT) for each hydrographic station. Except where primary productivity analyses were not performed (see Introduction), the data for each hydrographic station are separated into two sections ("Physical and Chemical" and "Biological").

The physical oceanographic properties listed in the first seven columns of the "Physical and Chemical" section of each station's data are the uncorrected values measured by the CTD at the times each Niskin bottle was tripped. Because they are uncorrected, these values may differ slightly from those listed in Table A2. The last four columns of this section of each station's data give the nitrate ( $\text{NO}_3$ ), nitrite ( $\text{NO}_2$ ), phosphate ( $\text{PO}_4$ ), and dissolved silicate ( $\text{SiO}_4$ ) concentrations (determined as described previously).

The “Biological” section of each station’s data gives the results of the primary productivity analyses. As stated above, primary productivity sampling was not undertaken at every hydrographic station.

4) Table A4: Marine Mammal Data

This table lists the results of the marine mammal observations made during the cruise. The data are listed by species code, then chronologically within each species code.

**Figures of Results (in Appendix B)**

Graphical representations of the data collected during this cruise follow the tabulated data in Appendix A. Figure 6 is a series of four diagrams contouring (a) the temperature ( $^{\circ}\text{C}$ ), (b) the salinity, (c) the density anomaly ( $\text{kg m}^{-3}$ ), and (d) the oxygen ( $\mu\text{m kg}^{-1}$ ) fields along the line of hydrographic stations from Moss Landing, California, to Point Reyes, California. The two blue lines in each diagram indicate the locations of the corner hydrographic stations (CTDs 11/12/13 and 17/18).

Figure 7 contours the fluorescence and transmissivity in the upper 100 meters of the water column along the line of hydrographic stations from Moss Landing to Point Reyes. Again, the blue lines indicate the locations of the corner hydrographic stations.

Figure 8 is a series of four diagrams contouring (a) the nitrate ( $\mu\text{m}$ ), (b) nitrite ( $\mu\text{m}$ ), (c) phosphate ( $\mu\text{m}$ ), and (d) silicate ( $\mu\text{m}$ ) fields along the line of hydrographic stations from Moss Landing to Point Reyes. The white lines indicate the locations of the corner hydrographic stations.

Figure 9 charts the locations of marine mammal sightings during the cruise.

Finally, Figure 10 is an AVHRR satellite image of sea surface temperature of the area of operation. The image was taken during the latter part of the cruise.

**Cruise Participants**

Personnel	Duties	Affiliation
Tim Pennington (Chief Sci.)	Nutrients, Primary Productivity	Monterey Bay Aquarium Research Institute
Marguerite Blum	Nutrients, Primary Productivity, Oxygens	
Erich Rienecker	Nutrients	
Doug Conlin	Physical Oceanography	
Curt Collins	Physical Oceanography	Naval Postgraduate School
Katherine Whitaker	Marine Mammal Observer	
MIDN Troy Benbow, USN	Marine Mammal Observer	
MIDN Charlotte Hill, USN	Nutrients	
Kit Clark	Phytoplankton Net Tows	University of California, Santa Cruz
Turtle Haste	Nutrients	Teacher At Sea Program
Elsa Stuber	Phytoplankton Net Tows	

### Literature Cited

Chavez, F. P., R. T. Barber, A. Huyer, P. M. Kosro, S. R. Ramp, T. Stanton, and B. Rojas de Mendiola, Horizontal advection and the distribution of nutrients in the coastal transition zone off northern California: effects on primary production, phytoplankton biomass and species composition, *J. Geophys. Res.*, 96, 14833-14848, 1991.

Collins, C. A., J. T. Pennington, C. G. Castro, T. A. Rago, and F.P. Chavez, The California Current system off Monterey, California: physical and biological coupling, *Deep-Sea Res. II*, 50, 2389-2404, 2003.

Holm-Hansen, O., C. J. Lorenzen, R. W. Holmes, and J. D. H. Strickland, Fluorometric determination of chlorophyll, *J. Cons. Perm. Int. Explor. Mer*, 30, 3-15, 1965.

Kramer, D., M. J. Kalin, E. G. Stevens, J. R. Thrailkill, and J. R. Zweifel, Collecting and processing data on fish eggs and larvae in the California Current region, *NOAA Tech. Rep. NMFS CIRC-370*, 38 pp., Seattle, WA, 1972.

Owens, W. B., and R. C. Millard Jr., A new algorithm for CTD oxygen calibration, *J. Phys. Oceanogr.*, 15, 621-631, 1985.

Parsons, T. R., Y. Maita, and C. M. Lalli, A manual of chemical and biological methods for seawater analysis, 173 pp., Pergamon Press, New York, 1984.

Pennington, J. T., and F. P. Chavez, Seasonal fluctuations of temperature, salinity, nitrate, chlorophyll and primary production at station H3/M1 over 1989-1996 in Monterey Bay, California, *Deep-Sea Res. II*, 47, 947-973, 2000.

Rago, T. A., R. Michisaki, B. Marinovic, and K. Whitaker, Physical, nutrient, and biological measurements of coastal waters off central California in October 2005, *NPS Tech. Rep. No. NPS-OC-06-001*, 75 pp., 2006.

Rago, T. A., R. Michisaki, B. Marinovic, M. Blum, and K. Whitaker, Physical, nutrient, and biological measurements of coastal waters off central California in June/July 2006, *NPS Tech. Rep. No. NPS-OC-07-001*, 79 pp., 2007a.

Rago, T. A., R. Michisaki, B. Marinovic, M. Blum, and K. Whitaker, Physical, nutrient, and biological measurements of coastal waters off central California in October 2006, *NPS Tech. Rep. No. NPS-OC-07-002*, 93 pp., 2007b.

Sakamoto, C. M., G. E. Friederich, and L. A. Codispoti, MBARI procedures for automated nutrient analyses using a modified Alpkem Series 300 Rapid Flow Analyzer, *MBARI Tech. Rep. No. 90-2*, 84 pp., 1990.

Steger, J. M., F. B. Schwing, C. A. Collins, L. K. Rosenfeld, N. Garfield, and E. Gezgin, The circulation and water masses in the Gulf of the Farallones, *Deep-Sea Res. II*, 47, 907-946, 2000.

UNESCO, Background papers and supporting data on the Practical Salinity Scale, 1978, *UNESCO Tech. Pap. In Mar. Sci.*, No. 37, 1981.

Venrick, E. L., and T. L. Hayward, Determining chlorophyll on the 1984 CalCOFI surveys, *CalCOFI Rep.* 25, 74-78, 1984.

## Appendix A

**Table A1:** *Meteorological and sea surface data collected during the PaCOOS cruise of June 2007.* Listed here are the meteorological and surface oceanographic conditions as measured by the underway data acquisition system of the *NOAA Ship McArthur-II* at the beginning of each hydrographic station. Continuous measurements of the water being pumped through the ship's uncontaminated seawater system ("sea chest") from approximately 3 meters below the surface supplied the oceanographic data, while instrumentation atop the ship's mast supplied the meteorological data.

Station	Yearday, 2007 (UTC)	Barometric Pressure (mb)	Wind Speed (kts)	Wind Direction (°T)	Sea Surface Temperature (°C)	Sea Surface Salinity
1	155.8687	1016.81	1.60	195	12.3615	33.4209
2	155.9410	1016.77	4.80	251	13.0917	33.6013
3	156.0028	1016.20	2.57	259	13.5631	33.3416
4	156.1132	1015.67	7.49	193	13.1048	33.4122
5	156.1965	1016.45	15.51	318	12.8459	33.5066
6	156.3521	1015.97	10.94	235	13.5335	32.4610
7	156.4951	1016.24	13.04	244	14.2730	32.5429
8	156.6375	1017.46	11.96	267	14.1604	32.5262
9	156.7813	1018.53	11.08	293	14.4585	32.5024
10	156.9347	1018.61	13.23	287	15.6007	32.6731
11	157.0743	1018.58	16.26	279	15.7821	32.7145
12	157.1208	1018.45	12.57	312	15.7573	32.7181
13	157.2944	1019.38	17.70	311	15.5275	32.7333
14	157.4993	1019.82	16.36	318	14.6978	32.5221
15	157.6340	1020.69	16.25	280	14.6946	32.5765
16	157.7646	1021.87	15.39	263	14.6555	32.5210
17	157.9007	1022.15	17.70	294	14.4405	32.5094
18	157.9410	1021.93	17.32	302	14.5552	32.5163
19	158.1757	1120.70	16.90	074	14.4544	32.5295
20	158.2701	1020.57	18.79	316	14.3238	32.5020
21	158.3840	1019.56	21.47	133	14.3995	32.5421
22	158.4694	1018.70	18.83	316	14.1308	32.5883
23	158.5701	1018.61	20.91	279	13.8188	32.7425
24	158.6646	1018.96	23.19	118	13.5743	32.6494
25	158.7750	1018.90	23.35	283	13.8497	32.6011
26	158.8646	1017.97	19.53	270	13.4451	32.8033
27	158.9729	1016.33	24.60	312	14.1866	33.3182
28	159.0681	1015.76	22.06	049	12.8907	32.7721
29	159.1854	1015.64	23.99	322	13.2350	33.1169
30	159.2757	1015.39	21.53	277	12.5062	33.3049
31	159.3861	1014.82	20.47	328	12.1998	33.6051
32	159.4750	1014.12	18.56	292	12.5022	33.2682
33	159.5889	1014.76	11.51	316	12.6345	33.2372
34	159.6833	1015.50	4.22	138	11.0985	33.6695
35	159.7819	1014.83	9.00	250	13.0974	33.6575
36	159.9264	1014.16	18.10	284	11.3837	33.4489
37	160.1347	1013.54	18.11	117	12.3700	33.3310
38	160.2757	1013.84	11.47	002	12.2479	33.6669
39	160.4285	1013.02	11.25	317	12.1360	33.4271

**Table A2:** *List at standard pressures of hydrographic data collected during the PaCOOS cruise of June 2007.* Stations are in chronological order, starting with station 0 that was collected pierside in San Francisco Bay. For each cast, the surface pressure (listed as 0 dbar) is actually 1 dbar, while the last pressure is the deepest pressure of the cast. (The exception is station 12, which was terminated early upon the cable's developing a leak. Its deepest pressure is the last pressure for which there are valid data.) Salinities and oxygens have been adjusted according to the calibration corrections determined from the collected salinity and oxygen water samples. The time listed for each station is the beginning (*<mm/dd/yyyy, hhmm>* UT) of the CTD cast. Units of geopotential anomaly ( $\Delta\Phi$ ), potential density ( $\sigma_\theta$ ), and potential spiciness ( $\pi_\theta$ ) are  $\text{m}^2\text{s}^{-2}$ ,  $\text{kg m}^{-3}$ , and  $\text{kg m}^{-3}$ , respectively.

**Station:** 0    **Date:** 06/04/2007, 1544    **Lat.:** 37° 47.19 N    **Long.:** 122° 23.05 W

P(dbar)	T(°C)	S	O <sub>2</sub> ( $\mu\text{m/kg}$ )	Xmiss(%)	$\Delta\Phi$	$\sigma_\theta$	$\pi_\theta$
0	15.298	29.988	236.7	15.4	0.058	22.049	-1.847
8	15.119	30.071	235.9	16.0	0.459	22.151	-1.818

**Station:** 1    **Date:** 06/04/2007, 2051    **Lat.:** 37° 56.90 N    **Long.:** 122° 53.26 W

P(dbar)	T(°C)	S	O <sub>2</sub> ( $\mu\text{m/kg}$ )	Xmiss(%)	$\Delta\Phi$	$\sigma_\theta$	$\pi_\theta$
0	10.336	33.809	354.2	80.3	0.020	25.965	0.256
10	9.476	33.874	275.0	87.7	0.215	26.160	0.160
20	9.131	33.912	235.6	89.9	0.395	26.249	0.137
30	9.012	33.935	225.8	90.2	0.570	26.283	0.133
43	8.702	33.956	115.0	84.6	0.791	26.348	0.099

**Station:** 2    **Date:** 06/04/2007, 2235    **Lat.:** 37° 51.82 N    **Long.:** 123° 03.89 W

P(dbar)	T(°C)	S	O <sub>2</sub> ( $\mu\text{m/kg}$ )	Xmiss(%)	$\Delta\Phi$	$\sigma_\theta$	$\pi_\theta$
0	12.082	33.778	368.8	81.8	0.024	25.625	0.553
10	10.408	33.845	364.0	81.7	0.213	25.981	0.297
20	9.383	33.892	254.2	88.6	0.402	26.189	0.159
30	9.020	33.909	220.9	88.3	0.581	26.261	0.113
50	8.688	33.949	133.9	89.9	0.921	26.345	0.092
75	8.402	33.970	120.0	85.9	1.333	26.405	0.064
83	8.419	33.981	101.8	83.8	1.463	26.412	0.075

Station: 3 Date: 06/05/2007, 0004 Lat.: 37° 46.91 N Long.: 123° 14.67 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	12.984	33.529	279.9	82.0	0.027	25.257	0.535
10	11.736	33.585	265.7	82.3	0.259	25.540	0.333
20	10.183	33.806	206.7	89.7	0.474	25.989	0.226
30	9.931	33.837	185.8	90.3	0.673	26.056	0.207
50	9.581	33.852	170.2	90.3	1.054	26.126	0.160
75	9.337	33.907	144.6	90.4	1.512	26.210	0.162
100	8.862	34.006	112.3	90.3	1.947	26.363	0.163
111	8.823	34.010	105.4	90.3	2.131	26.372	0.160

Station: 4 Date: 06/05/2007, 0201 Lat.: 37° 41.85 N Long.: 123° 25.58 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	12.322	33.622	284.9	84.4	0.025	25.458	0.476
10	11.292	33.676	292.1	82.1	0.243	25.692	0.322
20	9.452	33.552	225.8	87.3	0.461	25.912	-0.099
30	9.374	33.666	215.0	87.7	0.663	26.014	-0.022
50	9.318	33.749	218.7	89.1	1.054	26.089	0.035
75	8.743	33.802	167.7	90.5	1.518	26.221	-0.017
100	8.499	33.879	158.7	90.5	1.956	26.320	0.006
125	8.645	34.015	103.7	90.9	2.372	26.405	0.136
150	8.163	34.035	94.6	90.6	2.770	26.494	0.077
200	7.963	34.124	66.0	90.8	3.528	26.594	0.117
250	7.572	34.128	58.1	90.9	4.250	26.655	0.063
300	7.182	34.155	48.7	91.1	4.939	26.732	0.028
400	6.424	34.193	31.7	91.1	6.228	26.865	-0.045
500	5.832	34.230	19.2	91.0	7.412	26.970	-0.092
600	5.325	34.283	11.5	90.8	8.512	27.075	-0.112
700	4.958	34.338	8.5	90.8	9.528	27.161	-0.112
800	4.572	34.389	8.8	90.8	10.468	27.246	-0.115
900	4.189	34.429	11.4	91.0	11.336	27.320	-0.125
1000	3.920	34.455	14.8	91.1	12.151	27.369	-0.132
1012	3.905	34.456	15.1	91.1	12.245	27.371	-0.133

Station: 5 Date: 06/05/2007, 0443 Lat.: 37° 36.84 N Long.: 123° 36.20 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	12.266	33.682	300.5	80.2	0.025	25.515	0.512
10	11.000	33.688	306.7	78.9	0.239	25.754	0.278
20	9.926	33.726	269.9	83.9	0.452	25.970	0.119
30	9.652	33.750	247.1	87.3	0.651	26.034	0.091
50	9.007	33.781	192.5	90.3	1.031	26.163	0.009
75	8.692	33.841	169.2	90.5	1.485	26.260	0.006
100	8.650	33.888	184.4	90.5	1.919	26.304	0.037
125	8.394	33.925	134.7	90.6	2.343	26.373	0.026
150	8.152	33.993	116.2	90.8	2.749	26.462	0.043
200	7.947	34.102	70.6	90.9	3.514	26.580	0.098
250	7.660	34.142	58.8	91.0	4.240	26.653	0.086
300	6.714	34.087	58.8	91.1	4.930	26.742	-0.089
400	6.422	34.201	29.7	91.1	6.202	26.872	-0.039
500	5.633	34.250	16.3	91.1	7.366	27.011	-0.100
600	5.186	34.305	10.0	91.0	8.430	27.109	-0.111
700	4.747	34.365	8.1	91.0	9.402	27.207	-0.114
800	4.466	34.399	9.0	91.0	10.304	27.265	-0.118
900	4.107	34.438	12.5	91.0	11.152	27.335	-0.126
1000	3.883	34.461	15.9	90.9	11.952	27.377	-0.131
1015	3.841	34.465	16.7	90.9	12.069	27.384	-0.133

Station: 6 Date: 06/05/2007, 0827 Lat.: 37° 26.77 N Long.: 123° 58.24 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.159	32.637	288.6	81.8	0.034	24.532	-0.140
10	11.941	32.728	291.0	81.5	0.324	24.836	-0.310
20	11.323	32.744	270.8	90.1	0.629	24.962	-0.416
30	10.729	32.751	266.9	90.7	0.922	25.072	-0.520
50	10.398	32.955	249.1	91.0	1.482	25.289	-0.415
75	9.792	33.273	222.5	90.5	2.098	25.640	-0.266
100	9.248	33.626	211.4	90.7	2.637	26.004	-0.076
125	8.860	33.737	166.9	90.7	3.124	26.153	-0.050
150	8.428	33.851	139.4	90.6	3.574	26.310	-0.028
200	7.727	33.993	107.0	91.0	4.377	26.526	-0.020
250	7.251	34.053	81.4	91.1	5.112	26.641	-0.042
300	6.833	34.084	62.4	91.2	5.812	26.723	-0.076
400	5.791	34.091	45.2	91.2	7.100	26.865	-0.206
500	5.191	34.156	25.3	91.2	8.267	26.989	-0.227
600	4.899	34.264	10.9	91.2	9.334	27.109	-0.176
700	4.584	34.328	7.2	91.2	10.312	27.195	-0.161
800	4.335	34.402	9.3	91.1	11.218	27.282	-0.130
900	4.152	34.443	12.1	91.2	12.063	27.334	-0.118
1000	3.963	34.463	15.2	91.2	12.868	27.370	-0.122
1012	3.934	34.464	15.7	91.2	12.962	27.375	-0.124



Station: 7 Date: 06/05/2007, 1153 Lat.: 37° 16.80 N Long.: 124° 19.86 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.948	32.711	275.1	86.7	0.035	24.430	0.085
10	13.699	32.694	276.6	86.3	0.314	24.468	0.018
20	13.277	32.684	278.8	86.4	0.653	24.545	-0.079
30	13.050	32.684	276.8	87.0	0.990	24.590	-0.125
50	12.102	32.600	278.4	89.0	1.645	24.707	-0.383
75	11.459	32.725	274.5	90.5	2.437	24.924	-0.407
100	10.544	32.853	263.4	91.0	3.168	25.186	-0.472
125	9.073	33.292	211.3	91.0	3.792	25.771	-0.371
150	8.537	33.585	181.5	91.0	4.301	26.084	-0.222
200	8.253	33.918	132.6	90.7	5.192	26.390	-0.002
250	7.577	33.972	114.9	91.0	5.989	26.531	-0.060
300	7.224	34.013	95.0	91.1	6.734	26.614	-0.078
400	6.212	34.064	57.4	91.1	8.116	26.791	-0.174
500	5.496	34.156	29.8	91.2	9.346	26.953	-0.191
600	5.054	34.245	13.5	91.2	10.441	27.076	-0.173
700	4.649	34.301	8.5	91.2	11.444	27.166	-0.176
800	4.418	34.373	7.5	91.2	12.375	27.250	-0.144
900	4.197	34.412	9.5	91.2	13.245	27.305	-0.137
1000	3.920	34.446	13.4	91.2	14.068	27.361	-0.140
1010	3.886	34.448	13.7	91.2	14.148	27.366	-0.142

Station: 8 Date: 06/05/2007, 1518 Lat.: 37° 06.76 N Long.: 124° 41.48 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.833	32.696	274.1	86.7	0.035	24.442	0.049
10	13.762	32.690	274.7	86.7	0.348	24.451	0.028
20	13.151	32.676	277.5	86.8	0.687	24.564	-0.111
30	12.758	32.651	276.4	86.9	1.022	24.621	-0.212
50	11.515	32.628	275.4	89.6	1.662	24.838	-0.474
75	11.248	32.697	272.9	89.9	2.431	24.941	-0.468
100	10.835	32.797	265.7	90.2	3.170	25.092	-0.465
125	10.311	32.945	252.7	90.4	3.869	25.297	-0.440
150	10.202	33.322	247.2	89.7	4.503	25.611	-0.158
200	8.474	33.789	151.7	90.9	5.547	26.254	-0.071
250	7.802	33.944	120.8	91.0	6.380	26.477	-0.049
300	7.269	34.010	94.5	91.1	7.142	26.606	-0.074
400	5.978	34.047	58.3	91.2	8.517	26.806	-0.218
500	5.134	34.088	39.2	91.3	9.746	26.941	-0.287
600	4.750	34.188	18.4	91.3	10.857	27.065	-0.252
700	4.656	34.301	8.0	91.2	11.868	27.166	-0.174
800	4.409	34.366	7.0	91.2	12.799	27.245	-0.151
900	4.109	34.406	8.5	91.2	13.668	27.309	-0.151
1000	3.802	34.442	12.1	91.2	14.483	27.370	-0.155
1010	3.782	34.444	12.6	91.2	14.562	27.374	-0.154

Station: 9 Date: 06/05/2007, 1845 Lat.: 36° 56.78 N Long.: 125° 03.29 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.111	32.675	276.0	87.2	0.035	24.368	0.092
10	13.706	32.673	277.2	86.6	0.353	24.450	0.003
20	13.165	32.689	281.5	86.2	0.692	24.571	-0.098
30	12.992	32.679	280.5	86.1	1.027	24.598	-0.141
50	12.569	32.673	275.1	89.0	1.686	24.676	-0.232
75	11.914	32.844	265.6	90.5	2.471	24.933	-0.225
100	10.899	32.854	261.8	90.8	3.203	25.125	-0.408
125	10.893	33.186	234.5	91.0	3.888	25.385	-0.143
150	9.878	33.410	197.3	91.1	4.498	25.733	-0.144
200	8.544	33.830	151.0	91.1	5.491	26.276	-0.028
250	7.946	33.961	132.8	91.1	6.329	26.470	-0.015
300	7.731	34.057	88.4	91.1	7.103	26.577	0.029
400	6.635	34.114	53.4	91.2	8.509	26.775	-0.080
500	5.774	34.156	31.6	91.2	9.762	26.919	-0.157
600	5.286	34.237	15.5	91.2	10.893	27.043	-0.153
700	4.710	34.293	8.2	91.2	11.915	27.154	-0.175
800	4.421	34.359	6.9	91.2	12.853	27.238	-0.155
900	4.115	34.415	9.5	91.2	13.723	27.316	-0.144
1000	3.820	34.445	13.0	91.2	14.535	27.371	-0.150
1012	3.804	34.454	14.2	91.2	14.629	27.379	-0.145

Station: 10 Date: 06/05/2007, 2226 Lat.: 36° 46.13 N Long.: 125° 24.35 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	15.258	32.850	263.7	88.6	0.037	24.259	0.484
10	14.738	32.860	265.3	88.8	0.324	24.379	0.375
20	14.325	32.857	267.9	89.0	0.673	24.464	0.282
30	14.269	32.859	267.7	89.0	1.019	24.478	0.271
50	14.028	32.851	269.3	88.7	1.707	24.522	0.212
75	12.965	32.914	272.1	88.7	2.536	24.786	0.040
100	12.312	33.027	260.5	90.8	3.302	25.000	-0.001
125	10.937	33.172	235.6	91.1	4.007	25.366	-0.146
150	9.958	33.356	204.0	91.2	4.626	25.678	-0.173
200	8.775	33.834	147.0	91.1	5.645	26.244	0.012
250	8.161	33.985	117.1	91.1	6.496	26.457	0.036
300	7.426	34.037	91.3	91.2	7.270	26.605	-0.031
400	6.433	34.090	52.3	91.2	8.662	26.783	-0.125
500	5.727	34.153	30.3	91.2	9.907	26.922	-0.166
600	5.128	34.219	15.2	91.3	11.043	27.047	-0.185
700	4.634	34.284	8.1	91.3	12.069	27.155	-0.190
800	4.383	34.353	6.3	91.3	13.007	27.238	-0.163
900	4.129	34.410	8.8	91.2	13.877	27.311	-0.146
1000	3.795	34.454	14.0	91.2	14.686	27.381	-0.145
1011	3.773	34.461	15.1	91.2	14.772	27.388	-0.143

Station: 11 Date: 06/06/2007, 0147 Lat.: 36° 37.37 N Long.: 125° 45.80 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	15.458	32.892	263.5	89.3	0.037	24.247	0.563
10	15.397	32.895	264.6	89.3	0.366	24.263	0.551
20	14.533	32.925	267.4	89.2	0.719	24.473	0.382
30	14.456	32.928	267.5	89.1	1.064	24.492	0.367
50	14.524	33.003	267.0	88.7	1.747	24.536	0.441
75	12.845	32.907	276.5	89.1	2.571	24.804	0.010
100	12.337	32.937	262.5	90.7	3.343	24.926	-0.068
125	11.029	33.127	241.6	91.0	4.057	25.314	-0.166
150	10.213	33.371	208.0	91.2	4.690	25.647	-0.117
200	8.918	33.856	164.2	91.2	5.713	26.239	0.052
202	8.929	33.870	153.1	91.2	5.749	26.248	0.065

Station: 12 Date: 06/06/2007, 0254 Lat.: 36° 37.47 N Long.: 125° 47.05 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	15.438	32.895	263.5	89.2	0.037	24.254	0.561
10	15.309	32.897	262.7	89.2	0.365	24.284	0.533
20	14.525	32.942	266.9	88.9	0.713	24.488	0.394
30	14.661	33.018	266.1	88.6	1.055	24.518	0.484
50	14.379	32.988	266.5	88.4	1.736	24.555	0.397
75	12.741	32.897	274.7	89.3	2.542	24.817	-0.019
100	12.213	32.992	259.3	90.8	3.308	24.992	-0.048
125	11.037	33.150	240.1	91.0	4.018	25.331	-0.146
150	10.145	33.473	200.8	91.1	4.632	25.738	-0.048
200	8.808	33.850	148.5	91.1	5.629	26.251	0.030
250	8.307	34.013	117.1	91.2	6.475	26.457	0.081
300	7.743	34.036	92.3	91.2	7.255	26.559	0.014
400	6.827	34.141	47.8	91.2	8.668	26.771	-0.033
500	5.709	34.139	35.6	91.3	9.928	26.913	-0.179
600	5.355	34.251	13.7	91.2	11.060	27.046	-0.134
700	4.653	34.271	9.6	91.3	12.093	27.142	-0.199
800	4.300	34.343	6.4	91.3	13.034	27.239	-0.180
900	4.170	34.406	8.3	91.2	13.910	27.303	-0.145
970	3.966	34.435	11.3	91.3	14.487	27.347	-0.142

Station: 13 Date: 06/06/2007, 0704 Lat.: 36° 34.61 N Long.: 125° 44.51 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	15.242	32.911	262.2	89.3	0.036	24.310	0.529
10	15.105	32.921	262.9	89.3	0.360	24.347	0.506
20	14.585	32.956	265.4	89.0	0.706	24.486	0.418
30	14.603	33.004	265.7	88.7	1.049	24.519	0.459
50	13.714	32.919	268.9	88.0	1.727	24.639	0.200
75	12.555	32.926	265.5	90.0	2.517	24.875	-0.033
100	11.408	33.021	249.6	91.0	3.263	25.164	-0.179
125	10.517	33.280	221.6	91.1	3.920	25.523	-0.136
150	9.934	33.613	189.9	91.2	4.490	25.883	0.027
200	8.851	33.863	169.8	91.2	5.457	26.255	0.047
250	8.486	34.050	102.3	91.1	6.304	26.458	0.137
300	7.458	34.007	100.2	91.2	7.081	26.577	-0.050
400	6.831	34.141	49.0	91.2	8.488	26.770	-0.033
500	5.935	34.170	31.1	91.2	9.751	26.911	-0.126
600	5.148	34.202	17.6	91.3	10.896	27.031	-0.197
700	4.588	34.266	9.4	91.3	11.932	27.146	-0.209
800	4.323	34.335	6.4	91.3	12.878	27.230	-0.184
900	4.168	34.405	8.3	91.3	13.757	27.303	-0.146
1000	3.878	34.447	12.8	91.3	14.579	27.366	-0.143
1100	3.629	34.480	18.7	91.3	15.350	27.418	-0.142
1200	3.416	34.500	23.5	91.3	16.081	27.455	-0.147
1300	3.156	34.511	25.8	91.3	16.780	27.489	-0.163
1400	2.965	34.529	32.0	91.3	17.449	27.521	-0.167
1500	2.770	34.544	38.3	91.3	18.090	27.551	-0.172
1750	2.360	34.580	53.5	91.3	19.578	27.616	-0.179
2000	2.063	34.605	66.7	91.3	20.932	27.661	-0.185
2500	1.779	34.641	92.0	91.3	23.404	27.715	-0.180
3000	1.624	34.662	113.4	91.3	25.730	27.746	-0.177
3500	1.530	34.676	130.8	91.3	27.998	27.767	-0.176
4000	1.497	34.686	145.8	91.3	30.239	27.781	-0.175
4500	1.531	34.689	151.4	91.0	32.530	27.785	-0.174
4547	1.534	34.689	151.3	91.0	32.750	27.785	-0.174

Station: 14 Date: 06/06/2007, 1159 Lat.: 36° 19.59 N Long.: 125° 33.20 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.407	32.703	274.1	87.2	0.036	24.328	0.178
10	14.371	32.700	275.1	87.2	0.359	24.333	0.167
20	13.472	32.691	282.9	87.0	0.708	24.512	-0.032
30	12.938	32.636	281.9	87.1	1.047	24.575	-0.187
50	12.661	32.646	274.6	89.6	1.716	24.637	-0.235
75	11.489	32.737	273.5	90.6	2.496	24.928	-0.391
100	11.012	32.808	267.7	90.8	3.239	25.069	-0.424
125	10.342	32.977	250.7	91.0	3.941	25.317	-0.409
150	9.678	33.334	214.1	90.9	4.561	25.708	-0.238
200	8.853	33.822	147.2	91.0	5.578	26.222	0.015
250	8.106	33.974	130.3	91.1	6.429	26.456	0.020
300	7.665	34.041	99.6	91.2	7.206	26.574	0.007
400	6.380	34.090	57.1	91.2	8.604	26.790	-0.132
500	5.798	34.185	30.5	91.2	9.840	26.939	-0.132
600	5.268	34.252	17.1	91.2	10.965	27.057	-0.143
700	4.806	34.296	11.3	91.2	11.991	27.146	-0.162
800	4.414	34.343	9.5	91.2	12.942	27.227	-0.168
900	4.163	34.395	11.0	91.2	13.826	27.295	-0.154
1000	3.824	34.434	14.3	91.2	14.651	27.361	-0.159
1011	3.788	34.438	14.4	91.3	14.738	27.368	-0.159

Station: 15 Date: 06/06/2007, 1513 Lat.: 36° 02.25 N Long.: 125° 20.25 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.433	32.760	277.2	87.0	0.036	24.366	0.229
10	14.450	32.760	276.9	87.0	0.355	24.363	0.233
20	13.263	32.741	288.5	85.9	0.704	24.592	-0.036
30	13.037	32.835	282.1	86.4	1.031	24.710	-0.007
50	12.211	32.857	269.5	89.7	1.662	24.887	-0.156
75	11.601	32.910	260.8	90.8	2.412	25.042	-0.232
100	11.242	33.088	244.9	91.0	3.120	25.246	-0.157
125	10.399	33.349	218.9	91.0	3.765	25.598	-0.101
150	9.820	33.535	202.0	91.0	4.336	25.841	-0.054
200	8.678	33.893	135.8	90.9	5.302	26.305	0.044
250	8.382	34.057	91.6	90.9	6.132	26.479	0.126
300	7.921	34.123	72.9	91.1	6.900	26.601	0.108
400	6.732	34.146	46.4	91.2	8.294	26.787	-0.042
500	5.771	34.152	36.6	91.2	9.550	26.916	-0.161
600	5.031	34.182	22.4	91.3	10.686	27.029	-0.226
700	4.904	34.303	11.2	91.2	11.727	27.140	-0.145
800	4.514	34.362	9.7	91.2	12.680	27.231	-0.143
900	4.100	34.403	10.8	91.3	13.559	27.308	-0.155
1000	3.853	34.441	14.3	91.2	14.379	27.364	-0.150
1010	3.840	34.446	15.1	91.2	14.458	27.369	-0.148

Station: 16 Date: 06/06/2007, 1821 Lat.: 35° 44.87 N Long.: 125° 07.45 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.393	32.712	273.6	87.5	0.036	24.338	0.182
10	14.032	32.715	276.3	87.4	0.355	24.415	0.106
20	13.265	32.701	280.0	87.6	0.698	24.560	-0.067
30	12.983	32.694	279.5	87.1	1.032	24.611	-0.132
50	12.111	32.695	274.9	89.6	1.685	24.780	-0.305
75	11.493	32.760	272.2	90.4	2.459	24.945	-0.372
100	10.970	32.820	265.4	90.7	3.196	25.086	-0.422
125	10.615	32.890	257.8	90.8	3.904	25.203	-0.430
150	10.043	33.200	229.5	90.9	4.566	25.542	-0.283
200	8.901	33.839	143.4	90.9	5.603	26.228	0.036
250	8.463	34.035	97.2	90.9	6.458	26.450	0.122
300	7.996	34.107	69.6	91.1	7.236	26.578	0.108
400	6.845	34.129	51.1	91.2	8.649	26.759	-0.040
500	6.120	34.177	32.6	91.2	9.922	26.893	-0.098
600	5.455	34.219	20.2	91.2	11.088	27.009	-0.147
700	4.635	34.232	14.0	91.2	12.154	27.114	-0.231
800	4.536	34.340	8.6	91.2	13.129	27.211	-0.157
900	4.344	34.403	10.4	91.2	14.030	27.283	-0.129
1000	4.040	34.444	14.1	91.2	14.874	27.347	-0.129
1014	3.993	34.450	15.3	91.2	14.988	27.357	-0.129

Station: 17 Date: 06/06/2007, 2137 Lat.: 35° 27.59 N Long.: 124° 54.75 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.085	32.691	276.1	86.3	0.035	24.386	0.098
10	14.051	32.692	277.2	86.7	0.353	24.394	0.092
20	13.597	32.678	280.6	86.1	0.704	24.476	-0.016
30	12.657	32.650	283.8	84.3	1.038	24.640	-0.233
50	12.102	32.648	274.2	89.6	1.691	24.745	-0.345
75	10.928	32.822	264.4	90.5	2.443	25.094	-0.428
100	10.696	32.988	258.4	90.3	3.143	25.264	-0.337
125	10.017	33.262	222.1	90.9	3.785	25.594	-0.238
150	9.171	33.648	172.2	90.9	4.329	26.035	-0.071
200	8.672	33.959	113.2	90.9	5.241	26.358	0.095
203	8.615	33.962	113.7	90.9	5.292	26.369	0.089

Station: 18 Date: 06/06/2007, 2235 Lat.: 35° 28.03 N Long.: 124° 56.45 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.193	32.698	275.9	86.8	0.035	24.368	0.127
10	14.133	32.696	277.1	86.8	0.355	24.380	0.112
20	13.750	32.684	279.6	86.4	0.707	24.450	0.021
30	12.896	32.663	283.9	85.5	1.048	24.604	-0.174
50	12.261	32.639	276.5	89.0	1.705	24.708	-0.321
75	11.149	32.812	265.5	90.5	2.473	25.047	-0.395
100	10.689	32.971	258.3	90.4	3.177	25.253	-0.351
125	10.171	33.240	221.4	91.0	3.827	25.551	-0.229
150	9.151	33.525	182.9	90.9	4.391	25.942	-0.173
200	8.944	33.926	116.9	90.9	5.341	26.289	0.111
250	8.119	34.015	108.3	91.1	6.165	26.487	0.054
300	7.500	34.094	83.5	91.2	6.918	26.639	0.025
400	6.744	34.158	46.1	91.1	8.296	26.795	-0.030
500	5.928	34.194	27.2	91.1	9.536	26.930	-0.109
600	5.228	34.243	14.8	91.2	10.656	27.054	-0.155
700	4.836	34.314	9.0	91.2	11.675	27.157	-0.144
800	4.505	34.387	9.3	91.2	12.612	27.251	-0.124
900	4.182	34.432	12.5	91.2	13.477	27.323	-0.123
1000	3.830	34.455	16.1	91.2	14.285	27.377	-0.142
1100	3.553	34.488	21.5	91.2	15.042	27.432	-0.143
1200	3.271	34.504	24.8	91.2	15.754	27.472	-0.158
1300	3.070	34.518	29.0	91.2	16.435	27.502	-0.165
1400	2.906	34.534	33.7	91.2	17.091	27.531	-0.168
1500	2.777	34.553	40.8	91.2	17.722	27.558	-0.165
1750	2.333	34.583	53.7	91.2	19.188	27.621	-0.179
2000	2.053	34.613	69.7	91.3	20.525	27.668	-0.179
2500	1.747	34.646	94.0	91.3	22.958	27.721	-0.178
3000	1.586	34.666	114.7	91.3	25.250	27.752	-0.177
3500	1.488	34.681	133.5	91.3	27.474	27.774	-0.176
4000	1.484	34.687	145.3	91.3	29.685	27.783	-0.174
4460	1.518	34.690	150.9	91.1	31.780	27.786	-0.174

Station: 19 Date: 06/07/2007, 0413 Lat.: 35° 32.57 N Long.: 124° 43.83 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.122	32.716	276.2	86.6	0.035	24.397	0.126
10	14.128	32.716	277.0	86.7	0.352	24.396	0.127
20	13.589	32.700	278.8	86.7	0.704	24.494	-0.001
30	12.950	32.680	278.7	86.9	1.039	24.607	-0.149
50	12.413	32.772	275.5	89.4	1.691	24.782	-0.184
75	10.783	32.807	263.7	90.8	2.441	25.108	-0.466
100	10.306	33.006	249.0	91.1	3.130	25.345	-0.392
125	9.884	33.332	209.9	91.0	3.752	25.672	-0.204
150	9.193	33.637	165.8	91.0	4.288	26.023	-0.077
200	8.297	33.887	137.4	90.9	5.198	26.358	-0.020
250	8.008	34.042	101.7	91.0	6.004	26.524	0.044
300	7.634	34.108	72.8	91.1	6.746	26.631	0.056
400	6.572	34.132	47.9	91.2	8.119	26.798	-0.074
500	5.936	34.188	29.6	91.2	9.358	26.924	-0.113
600	5.192	34.252	15.7	91.2	10.482	27.066	-0.152
700	4.797	34.321	10.1	91.2	11.492	27.166	-0.143
800	4.417	34.367	9.8	91.2	12.426	27.245	-0.149
900	4.230	34.427	13.3	91.2	13.295	27.313	-0.122
1000	3.884	34.456	17.4	91.2	14.107	27.373	-0.135
1011	3.857	34.460	18.0	91.2	14.193	27.379	-0.135

Station: 20 Date: 06/07/2007, 0629 Lat.: 35° 37.49 N Long.: 124° 33.26 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.023	32.687	277.5	86.6	0.035	24.396	0.082
10	14.020	32.687	278.4	86.6	0.352	24.397	0.081
20	12.952	32.638	289.6	85.3	0.700	24.574	-0.182
30	12.479	32.624	287.9	83.6	1.031	24.654	-0.289
50	11.910	32.678	278.0	88.0	1.675	24.804	-0.358
75	11.039	32.776	264.4	90.9	2.436	25.039	-0.444
100	10.259	33.064	242.3	90.8	3.126	25.398	-0.353
125	9.594	33.379	209.4	90.8	3.727	25.756	-0.216
150	9.087	33.675	165.8	90.9	4.259	26.069	-0.064
200	8.400	33.980	115.6	90.8	5.134	26.416	0.069
250	8.105	34.075	85.6	90.8	5.925	26.536	0.096
300	7.790	34.113	72.1	91.0	6.675	26.612	0.082
400	6.602	34.124	52.7	91.1	8.079	26.787	-0.077
500	5.813	34.189	28.3	91.1	9.312	26.941	-0.126
600	5.237	34.271	14.6	91.2	10.419	27.076	-0.132
700	4.938	34.349	9.7	91.2	11.426	27.173	-0.105
800	4.454	34.384	10.2	91.2	12.354	27.254	-0.132
900	4.166	34.431	13.4	91.2	13.211	27.323	-0.126
1000	3.853	34.454	16.8	91.2	14.019	27.374	-0.140
1012	3.834	34.455	17.2	91.2	14.113	27.377	-0.141



Station: 21 Date: 06/07/2007, 0913 Lat.: 35° 42.41 N Long.: 124° 22.61 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	14.031	32.729	274.8	87.2	0.035	24.426	0.117
10	14.027	32.729	275.9	87.3	0.349	24.427	0.116
20	12.749	32.657	283.7	85.3	0.692	24.628	-0.208
30	12.402	32.658	276.4	87.7	1.019	24.696	-0.277
50	11.339	32.689	269.2	90.1	1.643	24.917	-0.458
75	10.907	32.782	262.5	90.6	2.383	25.067	-0.464
100	10.772	32.877	256.2	90.7	3.097	25.165	-0.412
125	9.896	33.278	223.0	90.9	3.751	25.627	-0.245
150	9.167	33.639	161.9	90.9	4.284	26.029	-0.079
200	8.300	33.915	147.2	91.0	5.184	26.380	0.003
250	7.691	34.047	103.3	91.1	5.972	26.574	0.016
300	7.260	34.079	75.2	91.1	6.697	26.661	-0.021
400	6.313	34.154	40.9	91.1	8.028	26.849	-0.090
500	5.544	34.168	28.3	91.2	9.228	26.956	-0.176
600	5.234	34.276	14.0	91.1	10.324	27.079	-0.129
700	4.833	34.328	10.1	91.2	11.329	27.168	-0.134
800	4.494	34.379	9.9	91.2	12.263	27.246	-0.132
900	4.138	34.422	12.5	91.2	13.128	27.319	-0.136
1000	3.845	34.457	17.2	91.2	13.934	27.378	-0.138
1012	3.797	34.459	17.8	91.2	14.028	27.384	-0.141

Station: 22 Date: 06/07/2007, 1116 Lat.: 35° 47.60 N Long.: 124° 12.18 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.828	32.776	276.9	86.0	0.034	24.504	0.112
10	13.823	32.777	276.1	85.9	0.342	24.507	0.111
20	13.227	32.728	273.8	86.9	0.682	24.589	-0.054
30	12.652	32.904	270.0	89.3	1.003	24.838	-0.030
50	11.283	32.829	266.0	90.4	1.606	25.036	-0.356
75	10.834	33.065	244.7	90.7	2.305	25.300	-0.249
100	10.405	33.277	239.5	90.3	2.948	25.540	-0.157
125	9.554	33.547	187.5	90.8	3.515	25.894	-0.089
150	8.983	33.704	153.7	90.9	4.023	26.108	-0.057
200	8.100	33.945	129.4	91.0	4.894	26.433	-0.004
250	7.314	33.974	115.4	91.0	5.671	26.570	-0.096
300	6.842	34.038	84.0	91.1	6.390	26.686	-0.111
400	6.231	34.146	41.2	91.1	7.702	26.853	-0.107
500	5.672	34.209	23.3	91.1	8.895	26.974	-0.128
600	5.149	34.269	13.9	91.2	9.986	27.084	-0.144
700	4.712	34.327	9.7	91.1	10.979	27.181	-0.148
800	4.378	34.391	10.2	91.2	11.893	27.268	-0.135
900	4.136	34.432	13.3	91.1	12.743	27.328	-0.128
1000	3.821	34.463	17.5	91.2	13.542	27.385	-0.136
1010	3.800	34.464	18.1	91.2	13.619	27.388	-0.137

Station: 23 Date: 06/07/2007, 1341 Lat.: 35° 52.68 N Long.: 124° 01.68 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.500	32.931	292.7	80.1	0.032	24.691	0.166
10	13.492	32.928	293.3	80.3	0.324	24.690	0.162
20	13.330	32.907	292.1	80.6	0.649	24.707	0.111
30	11.260	32.761	271.8	89.6	0.954	24.987	-0.414
50	11.475	32.981	275.4	88.5	1.534	25.119	-0.198
75	10.637	33.244	250.9	90.1	2.200	25.474	-0.142
100	9.759	33.495	191.2	90.8	2.789	25.819	-0.095
125	9.117	33.680	158.0	90.9	3.307	26.068	-0.054
150	8.473	33.831	142.7	90.9	3.766	26.287	-0.037
200	8.030	33.946	123.2	90.9	4.601	26.445	-0.013
250	7.249	33.971	110.1	91.0	5.374	26.577	-0.107
300	7.036	34.077	70.1	91.1	6.090	26.691	-0.053
400	6.207	34.141	40.3	91.1	7.402	26.852	-0.114
500	5.295	34.173	27.0	91.2	8.581	26.990	-0.202
600	4.974	34.267	13.1	91.2	9.649	27.103	-0.165
700	4.472	34.314	9.6	91.2	10.626	27.196	-0.184
800	4.280	34.374	9.5	91.2	11.531	27.266	-0.157
900	4.050	34.430	12.9	91.1	12.377	27.335	-0.138
1000	3.794	34.463	18.1	91.1	13.170	27.387	-0.139
1017	3.766	34.471	20.4	91.2	13.300	27.396	-0.136

Station: 24 Date: 06/07/2007, 1557 Lat.: 35° 57.49 N Long.: 123° 50.44 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.179	32.836	291.7	79.7	0.033	24.681	0.024
10	13.178	32.841	291.8	81.8	0.325	24.686	0.027
20	12.959	32.875	290.9	81.9	0.649	24.756	0.009
30	11.851	32.901	280.1	87.2	0.950	24.987	-0.190
50	10.811	32.987	261.5	89.8	1.519	25.242	-0.316
75	10.074	33.208	228.5	90.8	2.166	25.542	-0.270
100	9.798	33.543	212.9	90.6	2.737	25.850	-0.050
125	8.797	33.700	159.1	90.8	3.240	26.134	-0.089
150	8.412	33.837	140.9	90.8	3.696	26.301	-0.042
200	7.952	33.995	117.6	91.0	4.512	26.495	0.014
250	7.364	34.050	85.6	91.1	5.259	26.623	-0.029
300	6.619	34.043	72.4	91.1	5.960	26.720	-0.137
400	5.982	34.126	41.7	91.1	7.252	26.868	-0.155
500	5.658	34.219	22.5	91.1	8.427	26.983	-0.122
600	5.074	34.269	14.0	91.1	9.504	27.093	-0.152
700	4.566	34.315	10.0	91.2	10.492	27.187	-0.173
800	4.363	34.382	9.8	91.2	11.405	27.263	-0.143
900	4.112	34.427	12.8	91.1	12.257	27.325	-0.135
1000	3.847	34.458	17.0	91.1	13.058	27.378	-0.137
1013	3.786	34.458	16.8	91.1	13.159	27.384	-0.144

Station: 25 Date: 06/07/2007, 1836 Lat.: 36° 02.63 N Long.: 123° 40.03 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.506	32.797	284.0	83.5	0.033	24.586	0.060
10	13.494	32.796	285.0	83.6	0.334	24.588	0.057
20	13.474	32.796	284.8	83.6	0.669	24.592	0.052
30	11.604	32.829	279.9	85.4	0.984	24.977	-0.295
50	10.772	33.020	256.8	89.8	1.551	25.276	-0.296
75	10.441	33.318	243.1	90.0	2.188	25.565	-0.118
100	9.303	33.556	186.1	90.8	2.747	25.941	-0.122
125	8.886	33.829	150.7	90.9	3.223	26.221	0.027
150	8.484	33.917	131.8	90.7	3.659	26.353	0.033
200	8.114	34.018	107.3	91.0	4.474	26.489	0.056
250	7.156	34.020	90.9	91.0	5.228	26.629	-0.081
300	7.261	34.145	55.6	91.1	5.929	26.713	0.032
400	6.216	34.159	37.9	91.1	7.222	26.865	-0.099
500	5.604	34.217	20.9	91.1	8.395	26.988	-0.130
600	5.101	34.282	12.1	91.1	9.470	27.100	-0.139
700	4.745	34.346	8.6	91.1	10.455	27.192	-0.129
800	4.451	34.393	9.5	91.1	11.368	27.262	-0.125
900	4.103	34.431	12.4	91.1	12.222	27.330	-0.132
1000	3.812	34.462	16.7	91.1	13.017	27.385	-0.137
1012	3.781	34.466	17.5	91.1	13.110	27.392	-0.137

Station: 26 Date: 06/07/2007, 2045 Lat.: 36° 07.51 N Long.: 123° 29.51 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.055	32.995	286.9	81.4	0.031	24.829	0.125
10	13.024	32.995	288.0	81.5	0.311	24.836	0.118
20	12.876	32.986	287.6	81.7	0.621	24.858	0.080
30	11.950	32.880	274.1	86.2	0.926	24.953	-0.187
50	11.064	33.022	255.6	90.0	1.495	25.225	-0.241
75	9.752	33.248	218.7	90.9	2.124	25.626	-0.293
100	9.352	33.572	191.0	90.7	2.680	25.945	-0.102
125	8.959	33.814	150.5	90.9	3.162	26.198	0.027
150	8.619	33.941	133.5	90.9	3.601	26.351	0.073
200	7.811	33.982	114.5	91.0	4.414	26.505	-0.017
250	7.175	34.016	92.2	91.0	5.158	26.623	-0.082
300	7.229	34.137	54.5	91.0	5.862	26.711	0.020
400	6.040	34.146	37.8	91.1	7.156	26.877	-0.131
500	5.580	34.233	18.7	91.0	8.320	27.004	-0.120
600	5.042	34.296	10.4	91.0	9.372	27.117	-0.135
700	4.677	34.348	8.2	91.0	10.341	27.201	-0.135
800	4.380	34.404	10.1	91.0	11.246	27.278	-0.124
900	4.096	34.435	12.9	91.1	12.090	27.334	-0.130
1000	3.795	34.467	17.6	91.1	12.884	27.390	-0.135
1012	3.769	34.469	18.1	91.1	12.976	27.395	-0.136

Station: 27 Date: 06/07/2007, 2321 Lat.: 36° 12.55 N Long.: 123° 18.80 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	13.852	33.522	290.8	77.1	0.029	25.076	0.708
10	13.692	33.505	291.1	77.2	0.287	25.096	0.661
20	12.407	33.353	277.6	83.3	0.565	25.234	0.279
30	10.818	33.219	258.9	88.9	0.828	25.422	-0.128
50	10.345	33.421	246.6	89.7	1.310	25.661	-0.052
75	9.156	33.571	178.5	90.7	1.852	25.976	-0.134
100	8.956	33.744	150.3	90.8	2.333	26.143	-0.029
125	8.395	33.851	142.8	90.8	2.781	26.314	-0.033
150	8.407	34.005	112.4	90.7	3.198	26.434	0.091
200	7.548	34.026	96.8	90.9	3.971	26.577	-0.021
250	7.667	34.150	59.6	91.0	4.696	26.659	0.094
300	6.934	34.115	55.9	91.1	5.388	26.735	-0.038
400	6.106	34.172	32.1	91.0	6.666	26.889	-0.102
500	5.546	34.243	17.0	91.0	7.819	27.015	-0.117
600	5.122	34.316	10.2	90.9	8.870	27.124	-0.110
700	4.752	34.360	8.7	91.0	9.835	27.202	-0.118
800	4.427	34.402	9.9	91.0	10.738	27.272	-0.120
900	4.122	34.429	12.0	91.1	11.588	27.327	-0.132
1000	3.820	34.460	15.7	91.1	12.391	27.382	-0.138
1013	3.783	34.461	16.3	91.0	12.491	27.387	-0.141

Station: 28 Date: 06/08/2007, 0138 Lat.: 36° 17.61 N Long.: 123° 07.99 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	12.474	32.974	282.9	81.3	0.030	24.926	-0.009
10	12.466	32.975	284.5	81.5	0.302	24.928	-0.010
20	12.402	32.980	284.3	81.9	0.603	24.945	-0.019
30	10.615	33.157	257.9	88.0	0.891	25.409	-0.215
50	9.736	33.438	195.4	90.9	1.366	25.777	-0.143
75	9.385	33.716	166.8	90.6	1.885	26.052	0.019
100	9.094	33.917	121.1	90.5	2.348	26.257	0.131
125	8.754	33.978	108.8	90.5	2.778	26.359	0.124
150	8.599	34.046	93.0	90.7	3.190	26.436	0.153
200	8.282	34.108	74.0	90.6	3.975	26.534	0.153
250	7.707	34.131	64.6	90.9	4.713	26.638	0.085
300	7.079	34.138	54.0	91.0	5.410	26.733	0.001
400	6.211	34.186	32.6	91.0	6.693	26.887	-0.078
500	5.523	34.227	20.2	91.1	7.852	27.006	-0.132
600	5.190	34.295	11.7	91.0	8.919	27.100	-0.119
700	4.829	34.352	9.3	91.0	9.905	27.187	-0.115
800	4.435	34.398	10.1	91.1	10.819	27.268	-0.123
900	4.121	34.429	12.3	91.1	11.670	27.327	-0.132
1000	3.830	34.460	16.3	91.1	12.471	27.382	-0.137
1012	3.803	34.463	17.0	91.1	12.564	27.387	-0.138

Station: 29 Date: 06/08/2007, 0427 Lat.: 36° 22.59 N Long.: 122° 57.29 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	12.883	33.321	285.9	78.1	0.028	25.116	0.349
10	12.873	33.323	286.6	78.7	0.284	25.119	0.349
20	12.846	33.328	287.3	79.0	0.567	25.129	0.347
30	11.323	33.468	267.4	85.5	0.837	25.525	0.162
50	9.781	33.582	200.2	90.2	1.291	25.882	-0.021
75	9.370	33.760	144.6	90.6	1.794	26.089	0.051
100	9.183	33.909	120.1	90.4	2.257	26.237	0.138
125	8.640	33.993	104.4	90.7	2.688	26.388	0.118
150	8.380	34.044	88.1	90.7	3.091	26.468	0.118
200	7.733	34.076	76.6	90.9	3.855	26.590	0.046
250	7.240	34.088	67.8	91.0	4.570	26.670	-0.016
300	6.860	34.120	56.1	91.0	5.251	26.749	-0.043
400	6.180	34.192	30.4	91.0	6.519	26.895	-0.078
500	5.649	34.228	19.6	91.1	7.680	26.991	-0.116
600	5.134	34.301	10.8	91.0	8.744	27.111	-0.120
700	4.812	34.355	8.9	91.0	9.725	27.192	-0.115
800	4.407	34.402	10.0	91.1	10.636	27.274	-0.122
900	4.123	34.432	12.7	91.1	11.481	27.329	-0.129
1000	3.826	34.462	16.8	91.1	12.279	27.384	-0.136
1011	3.809	34.463	17.1	91.1	12.364	27.386	-0.137

Station: 30 Date: 06/08/2007, 0637 Lat.: 36° 27.58 N Long.: 122° 46.64 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	12.119	33.513	265.5	82.5	0.026	25.412	0.350
10	12.114	33.512	267.3	82.8	0.256	25.412	0.348
20	12.052	33.504	266.7	82.9	0.511	25.418	0.329
30	12.026	33.502	266.0	83.0	0.767	25.421	0.322
50	10.202	33.473	229.4	90.2	1.244	25.727	-0.036
75	9.388	33.694	152.4	90.6	1.767	26.034	0.001
100	8.914	33.875	124.2	90.7	2.232	26.253	0.068
125	8.748	33.975	107.8	90.7	2.663	26.357	0.121
150	8.470	34.035	95.2	90.7	3.070	26.447	0.124
200	7.856	34.056	81.6	90.8	3.847	26.557	0.048
250	7.270	34.055	76.1	90.9	4.580	26.640	-0.038
300	6.833	34.115	56.0	91.0	5.270	26.748	-0.051
400	5.880	34.142	38.4	91.0	6.537	26.894	-0.154
500	5.367	34.203	21.3	91.0	7.688	27.005	-0.169
600	5.202	34.297	11.3	91.0	8.751	27.100	-0.115
700	4.843	34.353	9.1	91.0	9.735	27.186	-0.113
800	4.418	34.403	10.3	91.0	10.649	27.273	-0.121
900	4.131	34.431	12.7	91.0	11.497	27.327	-0.129
1000	3.786	34.466	17.6	91.0	12.297	27.391	-0.137
1011	3.771	34.469	18.2	91.0	12.382	27.394	-0.136

Station: 31 Date: 06/08/2007, 0916 Lat.: 36° 32.65 N Long.: 122° 36.08 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	11.815	33.817	282.1	78.7	0.023	25.705	0.532
10	11.814	33.818	284.0	78.7	0.228	25.706	0.532
20	11.787	33.816	283.4	78.7	0.456	25.710	0.526
30	10.566	33.731	229.6	86.4	0.679	25.865	0.233
50	9.633	33.783	166.6	89.8	1.078	26.064	0.114
75	9.097	33.895	139.9	90.4	1.542	26.239	0.114
100	8.877	33.971	115.6	90.5	1.979	26.333	0.138
125	8.719	34.004	102.5	90.4	2.396	26.385	0.139
150	8.487	34.030	99.5	90.7	2.805	26.441	0.123
200	7.960	34.051	91.8	90.8	3.587	26.537	0.059
250	7.559	34.096	73.3	90.9	4.327	26.632	0.036
300	6.994	34.112	61.9	90.9	5.032	26.724	-0.032
400	6.278	34.174	35.0	90.9	6.320	26.869	-0.079
500	5.675	34.231	21.1	90.9	7.492	26.991	-0.110
600	5.263	34.295	12.9	90.9	8.572	27.091	-0.110
700	4.885	34.349	10.1	90.9	9.562	27.178	-0.112
800	4.461	34.397	10.6	91.0	10.481	27.265	-0.120
900	4.131	34.434	13.7	90.9	11.333	27.329	-0.127
1000	3.871	34.462	17.6	91.0	12.133	27.379	-0.132
1011	3.854	34.465	18.4	91.0	12.219	27.383	-0.131

Station: 32 Date: 06/08/2007, 1124 Lat.: 36° 37.70 N Long.: 122° 25.42 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	12.193	33.481	262.3	84.9	0.026	25.373	0.339
10	12.146	33.481	263.1	85.2	0.259	25.382	0.330
20	11.935	33.485	260.1	85.6	0.517	25.426	0.292
30	11.573	33.522	255.0	86.5	0.768	25.522	0.252
50	10.236	33.839	209.4	88.2	1.218	26.006	0.260
75	9.215	33.932	147.0	90.2	1.681	26.248	0.162
100	9.013	34.004	115.2	90.0	2.115	26.338	0.186
125	8.768	34.039	95.4	89.8	2.530	26.404	0.174
150	8.586	34.050	91.1	90.1	2.937	26.442	0.154
200	8.155	34.112	73.1	90.1	3.712	26.556	0.137
250	8.083	34.122	68.1	90.1	4.461	26.576	0.133
300	7.758	34.145	59.8	90.3	5.194	26.642	0.102
400	6.675	34.174	41.5	90.4	6.561	26.817	-0.027
500	6.120	34.244	23.4	90.7	7.802	26.946	-0.045
600	5.420	34.280	14.2	90.9	8.916	27.061	-0.103
700	4.939	34.338	10.0	90.9	9.934	27.163	-0.114
800	4.540	34.392	10.2	90.9	10.872	27.251	-0.117
900	4.193	34.431	13.2	90.9	11.734	27.321	-0.123
1000	3.902	34.461	17.6	90.9	12.540	27.375	-0.130
1013	3.849	34.466	18.5	90.9	12.642	27.384	-0.131

Station: 33 Date: 06/08/2007, 1408 Lat.: 36° 42.64 N Long.: 122° 14.63 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	12.283	33.453	267.0	84.7	0.026	25.334	0.334
10	12.278	33.452	267.7	84.8	0.263	25.334	0.333
20	11.620	33.525	252.0	87.2	0.519	25.515	0.263
30	10.589	33.560	229.3	89.9	0.754	25.727	0.102
50	9.783	33.692	184.2	90.3	1.183	25.968	0.067
75	9.587	33.896	152.1	90.0	1.668	26.160	0.195
100	9.145	33.969	135.8	90.3	2.118	26.290	0.180
125	8.999	34.011	102.0	89.7	2.546	26.346	0.189
150	8.916	34.029	95.5	89.7	2.965	26.374	0.190
200	8.481	34.091	80.2	89.9	3.779	26.491	0.169
250	8.095	34.192	55.4	89.4	4.536	26.629	0.190
300	7.811	34.186	49.1	89.6	5.255	26.667	0.143
400	6.504	34.155	42.5	90.9	6.588	26.824	-0.065
500	5.901	34.245	21.8	90.0	7.788	26.973	-0.072
600	5.407	34.282	14.4	90.1	8.879	27.065	-0.103
700	4.899	34.344	10.6	90.6	9.889	27.173	-0.114
800	4.503	34.397	11.2	90.4	10.811	27.260	-0.116
900	4.175	34.432	14.0	90.4	11.674	27.323	-0.124
1000	3.893	34.459	18.0	90.5	12.475	27.375	-0.132
1011	3.889	34.460	18.1	90.4	12.562	27.375	-0.132

Station: 34 Date: 06/08/2007, 1624 Lat.: 36° 44.10 N Long.: 122° 01.12 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	10.621	33.878	229.1	85.0	0.020	25.969	0.361
10	10.625	33.877	229.5	84.7	0.203	25.968	0.360
20	10.460	33.890	218.2	87.2	0.404	26.007	0.341
30	10.220	33.912	196.5	87.3	0.600	26.066	0.316
50	9.637	33.925	165.2	89.2	0.976	26.174	0.227
75	9.024	33.972	126.6	88.0	1.417	26.311	0.163
100	8.891	33.999	117.1	88.6	1.841	26.353	0.163
125	8.795	34.017	117.5	90.1	2.259	26.383	0.161
150	8.530	34.049	102.0	90.1	2.669	26.449	0.145
200	8.060	34.120	70.4	90.0	3.439	26.577	0.129
250	7.679	34.154	58.6	90.3	4.165	26.660	0.099
300	7.289	34.156	52.6	90.3	4.859	26.718	0.044
400	6.633	34.198	35.4	90.4	6.169	26.841	-0.014
500	6.081	34.235	24.0	90.3	7.374	26.943	-0.057
600	5.443	34.292	17.5	89.0	8.492	27.068	-0.091
700	4.785	34.360	13.1	89.5	9.487	27.198	-0.114
800	4.535	34.389	14.0	88.9	10.405	27.250	-0.119
900	4.128	34.431	18.2	88.5	11.257	27.327	-0.130
1000	3.889	34.453	21.8	87.5	12.064	27.370	-0.137
1010	3.880	34.454	22.1	87.4	12.143	27.372	-0.138

Station: 35 Date: 06/08/2007, 1846 Lat.: 36° 47.83 N Long.: 121° 50.86 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	12.441	33.856	314.0	72.2	0.024	25.616	0.684
10	12.143	33.851	306.7	69.7	0.234	25.670	0.621
20	11.625	33.847	269.1	77.6	0.460	25.764	0.519
30	9.868	33.873	185.9	89.0	0.665	26.095	0.225
50	9.216	33.962	138.9	85.6	1.026	26.272	0.187
75	9.062	33.993	129.2	88.0	1.455	26.321	0.185
100	8.857	34.024	108.6	86.7	1.878	26.378	0.177
125	8.645	34.050	95.1	88.4	2.287	26.432	0.164
150	8.495	34.068	85.6	88.2	2.685	26.469	0.154
200	8.033	34.115	66.7	87.0	3.450	26.577	0.121
227	7.794	34.137	57.5	85.0	3.846	26.630	0.103

Station: 36 Date: 06/08/2007, 2214 Lat.: 36° 44.09 N Long.: 122° 01.19 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	10.902	33.650	225.0	88.3	0.022	25.742	0.230
10	10.725	33.652	219.6	88.4	0.223	25.775	0.200
20	10.608	33.895	218.1	83.7	0.430	25.985	0.371
30	10.468	33.910	211.4	83.9	0.630	26.021	0.358
50	9.556	33.927	158.7	89.5	1.011	26.189	0.215
75	8.975	33.984	120.5	87.0	1.448	26.327	0.164
100	8.881	34.001	114.3	88.6	1.870	26.356	0.163
125	8.614	34.036	105.4	90.0	2.282	26.426	0.148
150	8.301	34.087	82.5	89.9	2.677	26.514	0.140
200	8.020	34.128	66.7	90.2	3.430	26.589	0.129
250	7.621	34.172	54.0	90.0	4.148	26.683	0.105
300	7.034	34.142	50.7	90.5	4.830	26.742	-0.003
400	6.234	34.225	27.7	90.1	6.100	26.915	-0.044
500	5.728	34.262	18.7	89.8	7.247	27.008	-0.080
600	5.189	34.315	14.6	89.3	8.288	27.116	-0.103
700	4.700	34.370	12.7	89.4	9.264	27.216	-0.115
800	4.491	34.394	13.4	89.3	10.167	27.259	-0.120
900	4.144	34.429	17.2	88.6	11.026	27.324	-0.129
1000	4.031	34.440	19.0	87.9	11.849	27.345	-0.133
1011	3.975	34.445	19.9	87.7	11.938	27.355	-0.135

Station: 37 Date: 06/09/2007, 0314 Lat.: 36° 57.33 N Long.: 122° 25.15 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	12.025	33.533	273.6	81.6	0.025	25.445	0.348
10	12.012	33.534	273.4	81.7	0.252	25.448	0.346
20	12.006	33.534	273.7	81.9	0.505	25.450	0.344
30	11.991	33.535	273.4	82.4	0.757	25.454	0.342
50	10.070	33.610	213.1	90.1	1.213	25.856	0.051
75	9.440	33.782	153.9	90.4	1.723	26.095	0.081
100	9.223	33.934	123.0	90.3	2.181	26.250	0.165
125	8.908	34.006	106.6	90.1	2.611	26.356	0.170
150	8.573	34.042	92.9	90.2	3.022	26.437	0.146
200	8.158	34.103	77.0	90.3	3.805	26.549	0.130
250	7.578	34.138	60.4	89.6	4.533	26.662	0.071
274	7.409	34.154	52.3	89.4	4.868	26.699	0.060



Station: 38 Date: 06/09/2007, 0637 Lat.: 37° 15.43 N Long.: 122° 37.86 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	11.887	33.875	312.4	77.4	0.022	25.737	0.592
10	11.640	33.869	292.8	79.5	0.224	25.778	0.539
20	9.917	33.850	200.8	89.5	0.427	26.068	0.215
30	9.342	33.900	149.6	90.2	0.613	26.203	0.159
50	8.975	33.958	116.7	89.8	0.962	26.307	0.145
75	8.659	34.025	84.1	87.4	1.381	26.410	0.147
90	8.628	34.031	71.1	86.2	1.623	26.419	0.147

Station: 39 Date: 06/09/2007, 1017 Lat.: 37° 33.53 N Long.: 122° 50.50 W

P(dbar)	T(°C)	S	O <sub>2</sub> (μm/kg)	Xmiss(%)	ΔΦ	σ <sub>θ</sub>	π <sub>θ</sub>
0	11.757	33.638	291.0	84.5	0.024	25.577	0.380
10	11.753	33.640	291.0	85.0	0.240	25.579	0.380
20	10.711	33.750	271.1	87.3	0.472	25.854	0.274
30	9.363	33.891	183.3	89.6	0.662	26.192	0.155
50	8.729	33.981	111.5	89.7	1.006	26.363	0.123
75	8.565	34.019	91.6	88.1	1.412	26.419	0.127
79	8.566	34.019	88.9	87.9	1.476	26.419	0.128

**Table A3:** *Results of nutrient and primary productivity analyses of water samples collected at each hydrographic station during the PaCOOS cruise of June 2007. Stations are in chronological (and numerical) order, except that there were no data collected at station 12. The time listed (<Mon. dd, yyyy hh:mm> UT) for each station is the beginning of the CTD cast. 12 Niskin bottles were tripped at each station, although some bottles sampled duplicate pressures. Except where primary productivity analyses were not performed (see Introduction), the data for each station are separated into two sections (“Physical and Chemical” and “Biological”).*

The physical oceanographic properties listed in the first seven columns of the “Physical and Chemical” section of each station’s data are the uncorrected values measured by the CTD at the times each Niskin bottle was tripped. Because they are uncorrected, these values may differ slightly from those listed in Table A2. The last four columns of this section give the nitrate (NO<sub>3</sub>), nitrite (NO<sub>2</sub>), phosphate (PO<sub>4</sub>), and dissolved silicate (SiO<sub>4</sub>) concentrations.

The “Biological” section of each station’s data gives the results of the primary productivity analyses. As stated above, primary productivity sampling was not undertaken at every hydrographic station.

Date	Jun 04, 2007 20:51	Cruise:	S307	Latitude:	37.948	Year:	2007
Project:	PACOOS	Station:	60-50	Longitude:	-122.888	Work week:	23
Platform:	RV MCARTHUR II	Cast:	1	Secchi Depth:	---	Day of Year:	155

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

#### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.7	12	11.522	33.674	25.648	79	3.036	0.172	0.311	7.417
5	4.9	11	10.979	33.725	25.787	81	9.509	0.220	0.939	12.750
10	9.5	10	9.483	33.903	26.182	88	14.318	0.259	1.386	17.422
20	19.6	9	9.112	33.919	26.254	90	17.301	0.296	1.644	21.430
30	30.1	8	9.004	33.933	26.282	90	18.305	0.343	1.768	23.686
40	41.2	7	8.702	33.953	26.346	85	22.378	0.393	2.535	33.657
40	41.2	6	8.702	33.953	26.346	85	22.262	0.400	2.592	33.482
40	41.6	5	8.704	33.954	26.346	85	22.328	0.398	2.529	33.299
40	40.3	4	8.705	33.954	26.346	86	22.116	0.385	2.488	32.756
40	41.4	3	8.702	33.954	26.346	86	21.748	0.433	2.580	31.290
40	40.9	2	8.706	33.953	26.345	87	21.241	0.376	2.409	30.107
40	41.6	1	8.707	33.954	26.346	86	21.058	0.367	2.109	28.471

#### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	6.194	0.742	0	100	479.629	77.434	0
5	11	4.032	0.936	5	50	269.052	66.721	3
10	10	1.144	0.772	5	30	234.041	58.039	5
20	9	0.129	0.258	10	15	45.248	39.541	8
30	8	0.083	0.379	20	5	1.500	11.634	15
40	7	0.182	1.616	20	1	0.817	6.333	31
				40	0.1	0.132	0.725	---

#### Integrated Value

*Integrated values are 1.0% of Surface Intensity (S.I.)*

Chlorophyll <i>a</i> :	36.79	mg m-2 day -1	Carbon Fixation:	2141.4	mg m-2 day-1
Phaeophytin:	14.77	mg m-2 day -1	Productivity Index:	58.21	mg C mg Chl day-1
Mixed Layer	2	meters	PBOpt:	77.43	mg C mg Chl day-1

Date	Jun 04, 2007 22:35	Cruise:	S307	Latitude:	37.863	Year:	2007
Project:	PACOOS	Station:	60-52.5	Longitude:	-123.064	Work week:	23
Platform:	RV MCARTHUR II	Cast:	2	Secchi Depth:	---	Day of Year:	155

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	0.9	12	13.119	33.743	25.396	82	1.272	0.102	0.111	4.426
5	5.7	11	10.727	33.797	25.888	80	2.338	0.130	0.375	5.887
10	9.7	10	10.363	33.836	25.981	82	8.020	0.178	0.813	10.246
20	19.4	9	9.455	33.882	26.170	88	13.653	0.212	1.230	16.506
30	30.1	8	9.055	33.901	26.249	89	18.745	0.252	1.496	23.542
40	40.7	7	8.800	33.928	26.311	90	24.493	0.344	2.120	31.498
60	60.1	6	8.573	33.962	26.373	90	26.762	0.318	2.183	36.588
80	81.0	5	8.405	33.971	26.406	84	26.778	0.361	2.380	39.308
80	80.5	4	8.406	33.972	26.407	84	---	---	---	---
80	82.2	3	8.411	33.975	26.409	84	---	---	---	---
80	82.6	2	8.416	33.978	26.410	84	---	---	---	---
80	82.3	1	8.411	33.975	26.409	84	---	---	---	---

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	3.324	0.653	0	100	148.420	44.650	0
5	11	7.084	2.243	5	50	286.529	40.447	3
10	10	4.705	3.283	5	30	389.027	54.916	4
20	9	4.060	2.579	10	15	131.078	27.862	7
30	8	1.835	2.413	20	5	46.630	11.486	10
40	7	1.453	2.150	30	1	6.029	3.286	16
60	6	0.708	1.589	40	0.1	0.569	0.392	25
80	5	0.409	1.134					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	72.95	mg m-2 day -1	Carbon Fixation:	2266.9	mg m-2 day-1
Phaeophytin:	39.16	mg m-2 day -1	Productivity Index:	31.08	mg C mg Chl day-1
Mixed Layer	---	meters	PBOpt:	54.92	mg C mg Chl day-1

Date	Jun 05, 2007 00:04	Cruise:	S307	Latitude:	37.781	Year:	2007
Project:	PACOOS	Station:	60-55	Longitude:	-123.244	Work week:	23
Platform:	RV MCARTHUR II	Cast:	3	Secchi Depth:	---	Day of Year:	156

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.3	12	12.710	33.532	25.313	83	11.174	0.282	0.676	13.412
5	4.7	11	11.854	33.556	25.495	83	13.522	0.356	1.073	15.201
10	9.5	10	11.385	33.621	25.633	83	17.755	0.427	1.461	19.660
20	20.2	9	10.183	33.804	25.987	90	21.903	0.444	1.661	24.926
30	30.4	8	9.772	33.842	26.086	90	22.046	0.338	1.681	25.527
40	40.2	7	9.708	33.841	26.097	90	21.387	0.322	1.673	25.469
60	60.9	6	9.360	33.896	26.197	90	24.450	0.296	1.844	29.307
80	81.2	5	9.131	33.936	26.266	91	26.451	0.268	2.075	32.309
100	101.9	4	8.824	34.008	26.371	90	28.401	0.184	1.995	36.214
100	101.5	3	8.822	34.008	26.371	90	---	---	---	---
100	101.8	2	8.824	34.008	26.371	90	---	---	---	---
100	101.9	1	8.831	34.008	26.369	90	---	---	---	---

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	0.908	0.253	0	100	75.588	83.227	0
5	11	0.999	0.307	5	50	82.672	82.752	5
10	10	0.863	0.392	5	30	115.402	115.514	9
20	9	0.324	0.229	10	15	66.977	77.627	15
30	8	0.248	0.197	20	5	10.753	33.164	26
40	7	0.232	0.220	30	1	2.146	8.655	44
60	6	0.119	0.250	40	0.1	0.291	1.257	74
80	5	0.075	0.187					
100	4	0.062	0.324					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	25.93	mg m-2 day -1	Carbon Fixation:	1859.0	mg m-2 day-1
Phaeophytin:	11.99	mg m-2 day -1	Productivity Index:	71.71	mg C mg Chl day-1
Mixed Layer	4	meters	PBOpt:	115.51	mg C mg Chl day-1

Date	Jun 05, 2007 02:01	Cruise:	S307	Latitude:	37.697	Year:	2007
Project:	PACOOS	Station:	60-57.5	Longitude:	-123.426	Work week:	23
Platform:	RV MCARTHUR II	Cast:	4	Secchi Depth:	---	Day of Year:	156

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.2	12	13.091	33.553	25.254	84	15.874	0.224	0.912	22.677
5	5.3	11	12.839	33.604	25.343	85	15.442	0.231	1.071	22.613
10	10.1	10	11.637	33.652	25.610	82	14.321	0.201	0.978	21.313
20	20.4	9	10.014	33.567	25.831	85	20.221	0.255	1.553	24.696
30	30.2	8	9.375	33.629	25.985	88	22.018	0.311	1.492	26.154
40	41.0	7	9.733	33.752	26.023	87	20.228	0.280	1.426	24.343
60	61.2	6	8.972	33.760	26.153	90	24.323	0.330	1.549	29.041
80	80.9	5	8.676	33.813	26.241	90	25.995	0.272	1.707	30.847
100	101.3	4	8.522	33.878	26.315	90	26.357	0.295	1.767	33.029
150	152.5	3	8.269	34.052	26.491	91	30.293	0.073	2.084	38.878
200	203.7	2	7.949	34.124	26.596	91	32.592	0.114	2.287	45.856
1000	1009.6	1	3.907	34.456	27.371	91	43.451	0.049	3.105	121.09

Date	Jun 05, 2007 04:43	Cruise:	S307	Latitude:	37.614	Year:	2007
Project:	PACOOS	Station:	60-60	Longitude:	-123.603	Work week:	23
Platform:	RV MCARTHUR II	Cast:	5	Secchi Depth:	---	Day of Year:	156

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.3	12	12.154	33.671	25.528	81	14.880	0.200	0.892	22.985
5	5.3	11	11.750	33.667	25.601	80	14.703	0.175	1.024	22.922
10	10.0	10	10.933	33.649	25.736	79	15.544	0.164	1.136	22.931
20	20.6	9	10.005	33.730	25.960	84	19.014	0.224	1.250	22.223
30	30.1	8	9.659	33.749	26.033	87	21.959	0.264	1.371	25.314
40	40.4	7	9.141	33.732	26.104	89	24.390	0.328	1.517	27.518
60	60.2	6	8.880	33.783	26.185	90	25.633	0.332	1.838	29.142
80	80.1	5	8.820	33.805	26.212	90	25.937	0.281	1.622	29.643
100	100.1	4	8.617	33.894	26.314	90	26.709	0.235	1.758	32.542
150	151.8	3	7.983	33.972	26.471	91	30.343	0.017	1.821	37.192
200	202.3	2	8.010	34.106	26.573	91	33.693	0.027	2.183	44.398
1000	1011.8	1	3.847	34.464	27.383	91	44.574	0.000	3.008	121.90

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	1.126	0.256	0	100	76.233	67.691	0
5	11	1.153	0.237	5	50	98.906	85.749	5
10	10	1.272	0.356	10	30	125.049	98.347	9
20	9	0.321	0.164	10	15	104.271	82.007	14
30	8	0.103	0.074	20	5	26.082	81.354	25
40	7	0.083	0.055	30	1	9.480	92.376	53
60	6	0.074	0.059	40	0.1	0.465	5.626	90
80	5	0.137	0.179					
100	4	0.045	0.089					
150	3	0.016	0.057					
200	2	0.005	0.064					
1000	1	0.001	0.056					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	31.19	mg m-2 day -1	Carbon Fixation:	2639.1	mg m-2 day-1
Phaeophytin:	10.29	mg m-2 day -1	Productivity Index:	84.62	mg C mg Chl day-1
Mixed Layer	7	meters	PBOpt:	98.35	mg C mg Chl day-1

Date Jun 05, 2007 08:27 Cruise: S307 Latitude: 37.446 Year: 2007  
 Project: PACOOS Station: 60-65 Longitude: -123.97 Work week: 23  
 Platform: RV MCARTHUR II Cast: 6 Secchi Depth: --- Day of Year: 156

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.3	12	13.136	32.635	24.534	82	1.161	0.110	0.213	7.446
5	5.3	11	13.079	32.643	24.552	82	1.316	0.109	0.224	7.303
10	10.1	10	12.065	32.717	24.805	81	1.967	0.193	0.275	6.683
20	19.7	9	11.585	32.746	24.916	89	2.932	0.523	0.440	3.936
30	29.9	8	10.994	32.761	25.034	91	4.592	0.174	0.401	4.236
40	40.0	7	10.510	32.741	25.103	91	5.366	0.102	0.439	4.790
60	60.1	6	9.975	32.961	25.366	91	10.870	0.044	0.693	9.528
80	80.3	5	9.839	33.235	25.602	90	1.936	0.316	1.208	21.038
100	101.7	4	9.231	33.517	25.922	91	24.025	0.361	1.439	25.667
150	152.0	3	8.475	33.813	26.273	91	28.080	0.071	1.692	31.170
200	201.7	2	7.774	33.995	26.520	91	31.374	0.092	1.971	39.760
1000	1010.5	1	3.934	34.465	27.375	91	44.925	0.056	2.989	120.35

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	1.299	0.465	0	100	76.777	59.116	0
5	11	1.380	0.502	5	50	111.158	80.521	4
10	10	1.907	0.882	10	30	94.333	49.460	7
20	9	2.098	1.031	10	15	83.552	43.808	11
30	8	1.235	0.639	20	5	9.623	4.587	17
40	7	0.581	0.309	30	1	0.664	0.538	26
60	6	0.268	0.208	40	0.1	0.079	0.136	41
80	5	0.110	0.175					
100	4	0.058	0.196					
150	3	0.006	0.085					
200	2	0.010	0.134					
1000	1	0.005	0.059					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	44.22	mg m-2 day -1	Carbon Fixation:	1377.0	mg m-2 day-1
Phaeophytin:	20.38	mg m-2 day -1	Productivity Index:	31.14	mg C mg Chl day-1
Mixed Layer	16	meters	PBOpt:	80.52	mg C mg Chl day-1

Date	Jun 05, 2007 11:53	Cruise:	S307	Latitude:	37.28	Year:	2007
Project:	PACOOS	Station:	60-70	Longitude:	-124.33	Work week:	23
Platform:	RV MCARTHUR II	Cast:	7	Secchi Depth:	---	Day of Year:	156

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.9	12	13.949	32.709	24.428	87	0.039	0.061	0.197	2.843
5	4.6	11	13.940	32.709	24.429	87	0.002	0.050	0.235	2.559
10	10.0	10	13.940	32.707	24.428	87	0.010	0.050	0.101	2.650
20	20.2	9	13.323	32.685	24.536	87	0.086	0.062	0.063	2.758
30	30.0	8	13.166	32.673	24.559	87	0.004	0.042	0.094	2.006
40	40.5	7	12.194	32.585	24.678	87	1.393	0.163	0.236	6.197
60	59.9	6	11.978	32.607	24.736	89	2.453	0.236	0.360	6.588
80	80.9	5	11.363	32.712	24.931	91	2.974	0.572	0.463	4.241
100	101.4	4	10.324	32.744	25.138	91	6.175	0.111	0.536	5.486
150	151.8	3	8.719	33.680	26.131	91	24.815	0.069	1.541	25.498
200	202.2	2	8.165	33.925	26.408	91	29.236	0.057	1.836	34.242
1000	1009.3	1	3.888	34.448	27.366	91	45.111	0.043	3.092	120.18

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	0.217	0.055	0	100	9.079	41.825	0
5	11	0.210	0.055	5	50	10.467	49.891	10
10	10	0.239	0.066	10	30	10.857	45.453	16
20	9	0.289	0.153	10	15	8.014	33.552	24
30	8	0.431	0.175	20	5	4.967	17.200	35
40	7	0.681	0.370	30	1	2.558	5.930	50
60	6	0.320	0.255	40	0.1	0.489	0.717	74
80	5	0.120	0.126					
100	4	0.035	0.169					
150	3	0.010	0.036					
200	2	0.012	0.076					
1000	1	0.002	0.024					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	13.56	mg m-2 day -1	Carbon Fixation:	366.49	mg m-2 day-1
Phaeophytin:	5.03	mg m-2 day -1	Productivity Index:	27.02	mg C mg Chl day-1
Mixed Layer	33	meters	PBOpt:	49.89	mg C mg Chl day-1



Date	Jun 05, 2007 15:18	Cruise:	S307	Latitude:	37.112	Year:	2007
Project:	PACOOS	Station:	60-75	Longitude:	-124.691	Work week:	23
Platform:	RV MCARTHUR II	Cast:	8	Secchi Depth:	---	Day of Year:	156

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.8	12	13.825	32.690	24.439	87	0.034	0.044	0.115	3.066
5	5.0	11	13.822	32.690	24.439	87	0.019	0.031	0.198	2.818
10	10.2	10	13.635	32.668	24.460	87	0.001	0.027	0.177	3.351
20	19.2	9	13.131	32.674	24.566	87	0.048	0.053	0.221	2.997
30	30.3	8	12.281	32.640	24.704	89	1.915	0.183	0.381	6.418
40	41.0	7	11.667	32.621	24.804	90	3.780	0.280	0.466	8.557
60	60.7	6	11.359	32.667	24.897	90	5.114	0.327	0.502	9.080
80	81.0	5	11.043	32.740	25.010	90	6.753	0.422	0.836	9.652
100	101.8	4	10.865	32.795	25.085	90	8.762	0.306	0.729	11.712
150	152.0	3	10.183	33.320	25.612	90	17.961	0.384	1.197	20.956
200	201.6	2	8.446	33.799	26.267	91	27.394	0.053	1.665	30.347
1000	1009.6	1	3.784	34.445	27.374	91	44.258	0.041	2.976	120.26

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	0.227	0.061	0	100	8.851	38.984	0
5	11	0.232	0.059	5	50	11.567	49.947	9
10	10	0.326	0.099	10	30	15.227	46.702	15
20	9	0.465	0.186	20	15	16.318	35.091	22
30	8	0.375	0.275	30	5	10.362	27.625	33
40	7	0.262	0.259	40	1	2.770	10.590	51
60	6	0.216	0.258	60	0.1	0.279	1.293	77
80	5	0.252	0.249					
100	4	0.172	0.216					
150	3	0.222	0.581					
200	2	0.008	0.039					
1000	1	0.003	0.012					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	16.78	mg m-2 day -1	Carbon Fixation:	547.32	mg m-2 day-1
Phaeophytin:	9.26	mg m-2 day -1	Productivity Index:	32.61	mg C mg Chl day-1
Mixed Layer	344	meters	PBOpt:	49.95	mg C mg Chl day-1

Date Jun 05, 2007 18:45 Cruise: S307 Latitude: 36.946 Year: 2007  
 Project: PACOOS Station: 60-80 Longitude: -125.054 Work week: 23  
 Platform: RV MCARTHUR II Cast: 9 Secchi Depth: --- Day of Year: 156

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.7	12	14.105	32.677	24.371	87	0.024	0.042	0.291	3.435
5	4.7	11	14.056	32.676	24.380	87	0.063	0.058	0.192	3.394
10	10.1	10	13.829	32.670	24.422	87	0.040	0.056	0.162	3.389
20	19.9	9	13.199	32.687	24.563	86	0.091	0.048	0.174	3.492
30	29.5	8	13.058	32.679	24.585	86	0.244	0.053	0.145	3.791
40	40.1	7	12.673	32.653	24.640	87	0.771	0.095	0.293	4.803
60	60.1	6	12.356	32.702	24.739	90	2.331	0.221	0.320	5.675
80	80.5	5	11.849	32.832	24.936	90	4.873	0.363	0.481	5.891
100	100.4	4	10.945	32.855	25.117	91	8.303	0.197	0.697	8.568
150	151.2	3	10.117	33.358	25.653	91	17.384	0.094	1.157	14.943
200	200.9	2	8.536	33.790	26.246	91	25.808	0.074	1.626	27.095
1000	1011.0	1	3.808	34.452	27.377	91	44.889	0.034	3.146	120.23

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	0.245	0.055	0	100	11.389	46.445	0
5	11	0.233	0.051	5	50	12.084	51.975	9
10	10	0.331	0.072	10	30	14.881	45.015	15
20	9	0.600	0.162	20	15	22.873	38.101	22
30	8	0.772	0.220	20	5	13.090	21.805	31
40	7	0.636	0.263	30	1	3.685	4.774	46
60	6	0.221	0.189	60	0.1	0.161	0.728	72
80	5	0.079	0.109					
100	4	0.064	0.086					
150	3	0.013	0.032					
200	2	0.005	0.056					
1000	1	0.008	0.033					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	22.65	mg m-2 day -1	Carbon Fixation:	606.90	mg m-2 day-1
Phaeophytin:	5.95	mg m-2 day -1	Productivity Index:	26.80	mg C mg Chl day-1
Mixed Layer	10	meters	PBOpt:	51.98	mg C mg Chl day-1

Date Jun 05, 2007 22:25 Cruise: S307 Latitude: 36.768 Year: 2007  
 Project: PACOOS Station: 60-85 Longitude: -125.405 Work week: 23  
 Platform: RV MCARTHUR II Cast: 10 Secchi Depth: --- Day of Year: 156

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.4	12	15.225	32.854	24.269	89	0.110	0.075	0.042	2.360
5	5.0	11	15.208	32.853	24.272	89	0.000	0.042	0.092	2.134
10	10.3	10	14.994	32.846	24.314	89	0.001	0.045	0.099	2.073
20	20.5	9	14.359	32.859	24.459	89	0.002	0.044	0.097	1.884
30	30.4	8	14.299	32.870	24.480	89	0.011	0.042	0.107	1.822
40	40.4	7	14.022	32.831	24.508	89	0.026	0.066	0.197	2.066
60	61.2	6	13.773	32.880	24.598	88	0.008	0.042	0.172	1.830
80	81.1	5	12.730	32.945	24.856	90	1.303	0.642	0.255	1.982
100	101.2	4	11.916	32.920	24.992	91	3.873	0.084	0.365	3.522
150	151.5	3	9.987	33.368	25.683	91	16.736	0.055	1.012	14.196
200	202.0	2	8.770	33.808	26.224	91	25.703	0.043	1.582	26.823
1000	1010.1	1	3.776	34.459	27.386	91	45.097	0.056	3.048	121.42

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	0.092	0.022	0	100	4.806	52.390	0
5	11	0.094	0.026	10	50	4.779	48.272	14
10	10	0.099	0.023	10	30	5.644	57.013	24
20	9	0.094	0.026	20	15	3.384	35.829	36
30	8	0.141	0.047	40	5	3.445	20.957	51
40	7	0.164	0.050	60	1	2.059	5.128	69
60	6	0.401	0.173	80	0.1	0.000	0.000	97
80	5	0.224	0.275					
100	4	0.084	0.079					
150	3	0.010	0.014					
200	2	0.002	0.014					
1000	1	0.001	0.010					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	10.61	mg m-2 day -1	Carbon Fixation:	274.65	mg m-2 day-1
Phaeophytin:	3.46	mg m-2 day -1	Productivity Index:	25.88	mg C mg Chl day-1
Mixed Layer	6	meters	PBOpt:	57.01	mg C mg Chl day-1

Date Jun 06, 2007 01:47 Cruise: S307 Latitude: 36.622 Year: 2007  
 Project: PACOOS Station: 60-90 Longitude: -125.763 Work week: 23  
 Platform: RV MCARTHUR II Cast: 11 Secchi Depth: --- Day of Year: 157

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.2	12	15.472	32.889	24.242	89	---	---	---	---
5	4.4	11	15.471	32.889	24.242	89	---	---	---	---
10	10.7	10	15.130	32.900	24.326	89	---	---	---	---
20	19.5	9	14.507	32.921	24.476	89	---	---	---	---
30	29.4	8	14.462	32.925	24.488	89	---	---	---	---
40	41.2	7	14.552	32.996	24.524	89	---	---	---	---
60	60.6	6	13.774	32.959	24.659	88	---	---	---	---
80	81.4	5	12.617	32.911	24.852	90	---	---	---	---
100	101.7	4	12.348	32.976	24.954	91	---	---	---	---
150	150.1	3	10.137	33.392	25.676	91	---	---	---	---
200	201.4	2	8.928	33.861	26.241	91	---	---	---	---
200	201.8	1	8.925	33.866	26.245	91	---	---	---	---

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	0.073	0.006	0	100	4.407	60.284	0
5	11	0.072	0.015	10	50	6.042	75.600	16
10	10	0.080	0.014	10	30	4.744	59.352	28
20	9	0.056	0.013	20	15	3.857	69.273	41
30	8	0.089	0.024	40	5	2.866	21.913	56
40	7	0.131	0.042	60	1	2.032	6.129	75
60	6	0.331	0.165	80	0.1	0.099	0.379	106
80	5	0.260	0.202					
100	4	0.099	0.114					
150	3	0.013	0.017					
200	2	0.002	0.010					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	8.79	mg m-2 day -1	Carbon Fixation:	300.88	mg m-2 day-1
Phaeophytin:	2.86	mg m-2 day -1	Productivity Index:	34.21	mg C mg Chl day-1
Mixed Layer	105	meters	PBOpt:	75.6	mg C mg Chl day-1

Date	Jun 06, 2007 07:04	Cruise:	S307	Latitude:	36.576	Year:	2007
Project:	PACOOS	Station:	60-90	Longitude:	-125.741	Work week:	23
Platform:	RV MCARTHUR II	Cast:	13	Secchi Depth:	---	Day of Year:	157

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.9	12	15.135	32.911	24.333	89	0.010	0.051	0.491	2.349
250	250.4	11	8.326	34.039	26.474	91	30.165	0.056	1.891	36.871
500	503.0	10	5.838	34.183	26.933	91	40.670	0.038	2.773	74.563
800	806.3	9	4.295	34.342	27.239	91	44.890	0.038	3.169	109.46
1000	1010.9	8	3.852	34.451	27.373	91	---	---	---	---
1000	1010.2	7	3.855	34.451	27.372	91	45.070	0.022	3.163	120.64
2000	2024.1	6	2.051	34.608	27.665	91	42.677	0.039	3.048	166.54
2500	2533.9	5	1.763	34.645	27.719	91	41.190	0.044	2.914	171.46
3000	3044.3	4	1.615	34.665	27.749	91	40.366	0.050	2.872	172.72
3500	3554.6	3	1.523	34.678	27.770	91	39.185	0.051	2.783	171.77
4000	4067.6	2	1.499	34.687	27.782	91	38.408	0.057	2.686	166.12
4465	4544.1	1	1.534	34.689	27.785	91	38.199	0.036	2.640	162.13

Date	Jun 06, 2007 11:59	Cruise:	S307	Latitude:	36.326	Year:	2007
Project:	PACOOS	Station:	61-90	Longitude:	-125.553	Work week:	23
Platform:	RV MCARTHUR II	Cast:	14	Secchi Depth:	---	Day of Year:	157

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.4	12	14.421	32.697	24.320	87	0.993	0.038	0.237	3.288
5	4.9	11	14.420	32.697	24.320	87	0.881	0.035	0.129	3.166
10	10.0	10	14.408	32.693	24.320	87	0.811	0.044	0.185	3.101
20	20.4	9	13.546	32.691	24.496	88	0.713	0.035	0.106	3.312
30	30.1	8	12.896	32.627	24.576	87	0.684	0.044	0.108	3.509
40	41.3	7	12.790	32.623	24.594	88	0.696	0.061	0.149	3.494
60	60.8	6	12.015	32.688	24.792	90	3.099	0.220	0.369	6.222
80	81.0	5	11.382	32.758	24.964	91	5.630	0.315	0.405	8.313
100	100.5	4	11.013	32.798	25.061	91	7.558	0.346	0.544	8.794
150	151.5	3	9.531	33.407	25.788	91	20.466	0.051	1.213	20.419
200	200.9	2	8.777	33.846	26.253	91	25.634	0.071	1.502	27.611
1000	1009.3	1	3.788	34.437	27.368	91	43.821	0.051	2.913	122.50

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	0.219	0.040	0	100	12.315	56.265	0
5	11	0.213	0.037	10	50	12.385	57.059	10
10	10	0.217	0.047	10	30	10.543	48.570	17
20	9	0.242	0.064	20	15	12.564	51.810	26
30	8	0.482	0.144	40	5	13.317	25.324	37
40	7	0.526	0.187	60	1	0.979	3.729	54
60	6	0.262	0.205	80	0.1	0.146	1.708	82
80	5	0.085	0.155					
100	4	0.051	0.118					
150	3	0.017	0.065					
200	2	0.005	0.033					
1000	1	0.001	0.007					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	16.62	mg m-2 day -1	Carbon Fixation:	571.90	mg m-2 day-1
Phaeophytin:	5.91	mg m-2 day -1	Productivity Index:	34.42	mg C mg Chl day-1
Mixed Layer	55	meters	PBOpt:	57.06	mg C mg Chl day-1

Date: Jun 06, 2007 15:13      Cruise: S307      Latitude: 36.037      Year: 2007  
 Project: PACOOS      Station: 63-90      Longitude: -125.337      Work week: 23  
 Platform: RV MCARTHUR II      Cast: 15      Secchi Depth: ---      Day of Year: 157

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.5	12	14.371	32.754	24.375	87	0.006	0.034	0.117	3.594
5	5.4	11	14.367	32.754	24.376	87	0.003	0.036	0.139	3.484
10	10.4	10	14.367	32.753	24.375	87	0.064	0.050	0.280	3.463
20	20.0	9	13.518	32.740	24.540	86	0.053	0.051	0.124	3.756
30	29.8	8	12.992	32.808	24.698	86	0.919	0.091	0.127	4.590
40	39.4	7	12.858	32.849	24.756	87	1.926	0.186	0.303	4.853
60	60.9	6	11.777	32.799	24.923	90	4.110	0.275	0.566	5.283
80	80.9	5	11.644	32.924	25.045	91	5.499	0.059	0.392	5.790
100	100.1	4	11.229	33.073	25.237	91	8.942	0.058	0.614	8.832
150	149.5	3	9.820	33.533	25.839	91	21.004	0.070	1.404	20.928
200	201.9	2	8.736	33.930	26.325	91	26.943	0.039	1.676	31.470
1000	1009.0	1	3.842	34.445	27.369	91	43.120	0.037	2.985	120.31

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	0.267	0.070	0	100	9.410	35.242	0
5	11	0.273	0.062	5	50	13.565	49.622	9
10	10	0.277	0.082	10	30	13.410	48.411	15
20	9	0.415	0.113	20	15	15.543	37.448	23
30	8	0.708	0.292	30	5	14.954	21.110	32
40	7	0.781	0.347	40	1	4.988	6.386	46
60	6	0.131	0.146	60	0.1	0.200	1.528	74
80	5	0.075	0.096					
100	4	0.042	0.061					
150	3	0.016	0.067					
200	2	0.006	0.057					
1000	1	0.002	0.015					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	22.63	mg m-2 day -1	Carbon Fixation:	583.09	mg m-2 day-1
Phaeophytin:	8.22	mg m-2 day -1	Productivity Index:	25.76	mg C mg Chl day-1
Mixed Layer	237	meters	PBOpt:	49.62	mg C mg Chl day-1

Date Jun 06, 2007 18:21 Cruise: S307 Latitude: 35.747 Year: 2007  
 Project: PACOOS Station: 65-90 Longitude: -125.124 Work week: 23  
 Platform: RV MCARTHUR II Cast: 16 Secchi Depth: --- Day of Year: 157

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.9	12	14.457	32.705	24.319	87	0.002	0.026	0.280	3.173
5	5.5	11	14.434	32.706	24.325	87	0.043	0.030	0.152	3.173
10	10.4	10	14.207	32.704	24.371	87	0.002	0.053	0.096	3.086
20	20.1	9	13.141	32.692	24.578	87	0.006	0.036	0.162	3.302
30	30.6	8	12.914	32.681	24.615	87	0.254	0.070	0.337	3.572
40	39.6	7	12.597	32.665	24.664	88	0.824	0.076	0.260	4.229
60	59.7	6	11.619	32.690	24.867	90	4.001	0.252	0.444	7.420
80	81.2	5	11.325	32.778	24.990	90	6.055	0.365	0.552	8.814
100	99.8	4	10.977	32.805	25.073	91	8.427	0.555	0.701	10.933
150	150.8	3	10.009	33.218	25.562	91	16.242	0.091	1.126	15.951
200	201.5	2	8.871	33.810	26.210	91	25.991	0.104	1.677	28.158
1005	1012.8	1	3.996	34.449	27.357	91	43.102	0.023	2.968	117.28

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAE0 (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	0.237	0.044	0	100	7.678	32.392	0
5	11	0.299	0.047	10	50	11.937	34.051	9
10	10	0.351	0.060	10	30	10.018	28.575	15
20	9	0.376	0.107	20	15	13.176	35.044	23
30	8	0.754	0.281	40	5	13.012	20.179	32
40	7	0.645	0.313	60	1	1.712	6.544	47
60	6	0.262	0.279	80	0.1	0.150	1.556	70
80	5	0.096	0.181					
100	4	0.083	0.155					
150	3	0.023	0.065					
200	2	0.010	0.063					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	18.92	mg m-2 day -1	Carbon Fixation:	474.80	mg m-2 day-1
Phaeophytin:	7.71	mg m-2 day -1	Productivity Index:	25.10	mg C mg Chl day-1
Mixed Layer	291	meters	PBOpt:	35.04	mg C mg Chl day-1



Date Jun 06, 2007 21:37 Cruise: S307 Latitude: 35.459 Year: 2007  
 Project: PACOOS Station: 67-90 Longitude: -124.912 Work week: 23  
 Platform: RV MCARTHUR II Cast: 17 Secchi Depth: --- Day of Year: 157

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.5	12	14.068	32.689	24.388	87	0.544	0.058	0.110	3.757
5	5.4	11	14.070	32.689	24.387	87	0.383	0.148	0.178	3.521
10	9.9	10	14.057	32.689	24.390	87	0.016	0.035	0.168	3.351
20	20.6	9	13.246	32.664	24.536	85	0.054	0.046	0.234	3.925
30	29.6	8	12.588	32.634	24.641	84	0.631	0.081	0.240	4.865
40	40.8	7	12.444	32.643	24.676	88	1.661	0.159	0.439	5.766
60	60.4	6	11.451	32.717	24.919	90	3.969	0.444	0.482	5.548
80	80.4	5	11.052	32.887	25.122	91	8.162	0.223	0.767	9.961
100	99.6	4	10.711	32.989	25.263	90	10.976	0.272	1.018	12.203
150	151.3	3	9.190	33.652	26.035	91	23.061	0.060	1.602	23.660
200	201.5	2	8.619	33.961	26.367	91	27.536	0.064	2.031	32.707
200	201.8	1	8.619	33.961	26.368	91	27.645	0.071	2.039	32.467

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	0.245	0.059	0	100	8.252	33.652	0
5	11	0.223	0.056	5	50	9.351	42.024	10
10	10	0.233	0.058	10	30	10.940	46.869	16
20	9	0.563	0.132	20	15	22.805	40.500	22
30	8	0.963	0.369	30	5	22.841	23.725	32
60	6	0.146	0.145	30	1	4.853	5.041	46
80	5	0.127	0.195	60	0.1	0.238	1.625	71
100	4	0.124	0.118					
150	3	0.013	0.043					
200	2	0.005	0.060					
200	1	0.006	0.063					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	27.34	mg m-2 day -1	Carbon Fixation:	671.23	mg m-2 day-1
Phaeophytin:	9.21	mg m-2 day -1	Productivity Index:	24.55	mg C mg Chl day-1
Mixed Layer	18	meters	PBOpt:	46.87	mg C mg Chl day-1

Date Jun 06, 2007 22:35 Cruise: S307 Latitude: 35.467 Year: 2007  
 Project: PACOOS Station: 67-90 Longitude: -124.94 Work week: 23  
 Platform: RV MCARTHUR II Cast: 18 Secchi Depth: --- Day of Year: 157

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	0.7	12	14.166	32.681	24.361	85	0.052	0.046	0.123	3.668
250	254.0	11	8.060	34.045	26.519	91	29.860	0.070	2.042	39.002
505	507.4	10	5.888	34.197	26.938	91	38.845	0.049	2.937	74.170
750	758.7	9	4.593	34.334	27.200	91	42.399	0.044	3.176	101.30
1000	1010.1	8	3.833	34.462	27.383	91	43.307	0.053	3.287	120.41
1500	1518.2	7	2.714	34.560	27.569	91	42.346	0.036	3.228	147.50
2000	2024.7	6	2.034	34.615	27.671	91	40.984	0.036	3.088	166.36
2500	2533.1	5	1.734	34.649	27.724	91	38.774	0.035	2.812	168.92
3000	3044.9	4	1.582	34.668	27.754	91	38.690	0.039	2.759	172.08
3500	3556.6	3	1.485	34.682	27.776	91	37.261	0.026	2.624	169.27
4000	4068.2	2	1.488	34.688	27.784	91	36.549	0.039	2.654	163.13
4380	4458.5	1	1.518	34.690	27.786	91	36.641	0.040	2.573	159.49

Date Jun 07, 2007 04:13 Cruise: S307 Latitude: 35.542 Year: 2007  
 Project: PACOOS Station: NPS 8 Longitude: -124.73 Work week: 23  
 Platform: RV MCARTHUR II Cast: 19 Secchi Depth: --- Day of Year: 158

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.4	12	14.128	32.711	24.393	86	0.090	0.067	0.282	3.372
50	50.1	11	12.396	32.765	24.780	89	2.318	0.154	0.377	5.750
100	101.9	10	10.321	33.023	25.357	91	12.413	0.089	1.052	12.616
200	201.7	9	8.230	33.908	26.385	91	27.108	0.053	1.753	32.306
300	301.2	8	7.653	34.107	26.628	91	32.686	0.039	2.306	47.138
400	403.8	7	6.550	34.134	26.802	91	36.954	0.040	2.609	62.799
500	504.9	6	5.818	34.190	26.941	91	39.215	0.036	2.882	76.554
600	606.1	5	5.133	34.257	27.077	91	41.416	0.029	3.107	91.897
700	706.8	4	4.762	34.333	27.180	91	41.859	0.036	3.179	101.15
800	807.2	3	4.428	34.385	27.258	91	42.428	0.021	3.269	108.61
900	907.9	2	4.168	34.432	27.324	91	42.201	0.049	3.131	113.18
1000	1010.0	1	3.856	34.460	27.379	91	42.549	0.036	3.188	119.70

Date Jun 07, 2007 06:30 Cruise: S307 Latitude: 35.624 Year: 2007  
 Project: PACOOS Station: 67-85 Longitude: -124.554 Work week: 23  
 Platform: RV MCARTHUR II Cast: 20 Secchi Depth: --- Day of Year: 158

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.5	12	14.013	32.694	24.403	87	0.000	0.031	0.028	3.756
5	4.4	11	14.010	32.693	24.403	87	0.019	0.041	0.097	3.663
10	9.7	10	14.005	32.691	24.403	87	0.009	0.034	0.145	3.630
20	20.3	9	13.128	32.662	24.558	86	0.007	0.037	0.120	3.832
30	29.5	8	12.599	32.648	24.650	85	0.887	0.110	0.291	4.763
40	40.7	7	12.361	32.644	24.693	87	1.481	0.141	0.397	5.337
60	60.5	6	11.658	32.694	24.863	90	3.752	0.273	0.558	6.861
80	80.7	5	10.806	32.820	25.114	91	7.967	0.111	0.595	8.616
100	101.2	4	10.261	33.052	25.389	91	13.718	0.284	0.994	14.357
150	151.0	3	8.974	33.699	26.106	91	24.534	0.051	1.645	26.026
200	200.7	2	8.406	33.987	26.420	91	---	---	---	---
1000	1010.4	1	3.837	34.455	27.377	91	42.528	0.033	3.102	119.20

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	0.232	0.055	0	100	8.543	36.886	0
5	11	0.227	0.053	5	50	14.047	61.868	10
10	10	0.244	0.054	10	30	13.314	54.498	16
20	9	0.344	0.097	20	15	20.651	59.994	24
30	8	0.926	0.261	30	5	27.062	29.212	33
40	7	0.781	0.296	40	1	6.987	8.946	47
60	6	0.168	0.175	60	0.1	0.214	1.271	72
80	5	0.117	0.192					
100	4	0.056	0.100					
150	3	0.008	0.046					
1000	1	0.001	0.008					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	23.77	mg m-2 day -1	Carbon Fixation:	785.25	mg m-2 day-1
Phaeophytin:	6.97	mg m-2 day -1	Productivity Index:	33.03	mg C mg Chl day-1
Mixed Layer	16	meters	PBOpt:	61.87	mg C mg Chl day-1

Date	Jun 07, 2007 09:13	Cruise:	S307	Latitude:	35.706	Year:	2007
Project:	PACOOS	Station:	NPS7	Longitude:	-124.376	Work week:	23
Platform:	RV MCARTHUR II	Cast:	21	Secchi Depth:	---	Day of Year:	158

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.4	12	14.103	32.743	24.423	87	0.000	0.027	0.028	3.281
50	50.0	11	11.222	32.705	24.950	90	6.709	0.449	0.509	9.842
100	102.5	10	10.884	32.949	25.201	90	9.992	0.318	0.699	11.478
200	201.1	9	8.048	33.915	26.418	91	27.800	0.063	1.708	33.357
300	302.7	8	7.337	34.115	26.679	91	35.365	0.079	2.585	51.367
400	403.1	7	6.362	34.158	26.845	91	38.885	0.078	2.945	66.346
500	504.2	6	5.541	34.166	26.955	91	38.410	0.086	2.897	72.650
600	606.1	5	5.181	34.286	27.094	91	39.064	0.077	2.973	82.810
700	706.2	4	4.778	34.325	27.171	91	43.830	0.059	3.152	99.982
800	808.2	3	4.473	34.381	27.250	91	43.961	0.059	3.163	107.12
900	908.2	2	4.119	34.425	27.323	91	44.608	0.081	3.166	115.79
1000	1010.4	1	3.796	34.458	27.384	91	44.579	0.066	3.174	121.93

Date Jun 07, 2007 11:16 Cruise: S307 Latitude: 35.793 Year: 2007  
 Project: PACOOS Station: 67-80 Longitude: -124.203 Work week: 23  
 Platform: RV MCARTHUR II Cast: 22 Secchi Depth: --- Day of Year: 158

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.5	12	13.746	32.782	24.526	86	0.000	0.069	0.055	3.310
5	5.1	11	13.748	32.782	24.526	86	0.001	0.051	0.278	3.246
10	10.4	10	13.745	32.780	24.524	86	0.000	0.054	0.178	3.171
20	19.9	9	12.848	32.705	24.646	87	0.693	0.107	0.174	3.723
30	31.0	8	12.500	32.899	24.863	90	1.576	0.640	0.193	2.276
40	40.6	7	11.518	32.781	24.956	90	5.582	0.403	0.504	7.177
60	61.1	6	10.792	32.920	25.194	91	9.175	0.296	0.618	10.276
80	81.2	5	10.387	33.107	25.411	91	13.753	0.284	0.831	13.628
100	100.1	4	10.092	33.413	25.699	90	18.520	0.457	1.110	18.515
150	151.5	3	8.730	33.805	26.227	91	25.248	0.097	1.571	26.914
200	201.8	2	8.007	33.965	26.463	91	27.659	0.072	1.834	34.170
1000	1009.3	1	3.807	34.464	27.387	91	41.139	0.049	2.898	113.07

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAE0 (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	0.390	0.111	0	100	12.333	31.654	0
5	11	0.361	0.111	5	50	21.093	58.502	8
10	10	0.387	0.108	10	30	19.517	50.445	13
20	9	0.450	0.216	20	15	21.061	46.848	21
30	8	0.268	0.231	30	5	5.403	20.166	32
40	7	0.130	0.117	40	1	2.027	15.608	56
60	6	0.071	0.106	60	0.1	0.356	5.025	96
80	5	0.063	0.099					
100	4	0.096	0.129					
150	3	0.009	0.033					
200	2	0.006	0.031					
1000	1	0.002	0.010					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	16.99	mg m-2 day -1	Carbon Fixation:	633.89	mg m-2 day-1
Phaeophytin:	9.44	mg m-2 day -1	Productivity Index:	37.32	mg C mg Chl day-1
Mixed Layer	19	meters	PBOpt:	58.5	mg C mg Chl day-1

Date	Jun 07, 2007 13:41	Cruise:	S307	Latitude:	35.877	Year:	2007
Project:	PACOOS	Station:	NPS 6	Longitude:	-124.028	Work week:	23
Platform:	RV MCARTHUR II	Cast:	23	Secchi Depth:	---	Day of Year:	158

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.4	12	13.350	32.858	24.665	80	1.238	0.068	0.069	7.996
50	48.0	11	10.766	32.830	25.128	90	8.628	0.301	0.524	9.896
100	101.3	10	9.715	33.393	25.746	91	19.640	0.213	1.265	19.194
200	202.3	9	8.059	33.939	26.435	91	---	0.055	---	30.677
300	304.3	8	7.021	34.085	26.699	91	35.243	0.069	2.324	53.103
400	404.5	7	5.725	34.078	26.863	91	---	0.040	---	61.469
500	505.6	6	5.126	34.154	26.995	91	---	---	---	---
600	606.6	5	5.007	34.282	27.111	91	42.454	0.058	3.008	93.453
705	711.8	4	4.422	34.321	27.207	91	43.508	0.049	3.024	104.70
800	807.5	3	4.235	34.382	27.276	91	44.209	0.040	3.050	111.60
900	909.3	2	4.016	34.432	27.340	91	42.440	0.063	2.970	114.02
1005	1012.8	1	3.772	34.469	27.395	91	43.142	0.050	2.997	119.17

Date Jun 07, 2007 15:57 Cruise: S307 Latitude: 35.958 Year: 2007  
 Project: PACOOS Station: 67-75 Longitude: -123.84 Work week: 23  
 Platform: RV MCARTHUR II Cast: 24 Secchi Depth: --- Day of Year: 158

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.2	12	13.188	32.844	24.686	79	1.354	0.125	0.182	7.299
5	5.7	11	13.184	32.845	24.688	81	1.059	0.083	0.273	6.412
10	11.2	10	13.181	32.845	24.689	81	1.143	0.107	0.216	6.881
20	20.7	9	13.137	32.848	24.699	81	1.337	0.106	0.258	6.970
30	31.4	8	11.836	32.868	24.965	86	4.328	0.151	0.477	8.371
40	40.4	7	11.162	32.839	25.066	89	6.239	0.259	0.624	8.256
65	63.2	6	10.852	33.099	25.323	90	11.847	0.373	0.897	14.135
80	80.1	5	10.079	33.223	25.553	91	16.279	0.196	1.101	15.731
100	101.9	4	9.770	33.522	25.838	91	21.169	0.175	1.351	21.152
150	152.4	3	8.382	33.867	26.329	91	26.756	0.045	1.770	30.297
200	203.6	2	7.755	34.001	26.528	91	28.140	0.053	1.863	36.550
1000	1010.3	1	3.799	34.459	27.384	91	44.254	0.023	3.143	121.36

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	1.208	0.318	0	100	35.049	29.016	0
5	11	1.190	0.328	5	50	71.013	59.687	5
10	10	1.235	0.325	5	30	71.651	60.223	8
20	9	1.290	0.355	10	15	57.844	46.831	13
30	8	0.917	0.397	20	5	29.080	22.549	20
40	7	0.336	0.283	20	1	7.251	5.623	32
80	5	0.064	0.091	40	0.1	0.564	1.678	54
100	4	0.073	0.123					
150	3	0.007	0.042					
200	2	0.003	0.023					
1000	1	0.003	0.010					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	39.95	mg m-2 day -1	Carbon Fixation:	1342.8	mg m-2 day-1
Phaeophytin:	10.88	mg m-2 day -1	Productivity Index:	33.61	mg C mg Chl day-1
Mixed Layer	184	meters	PBOpt:	60.22	mg C mg Chl day-1

Date	Jun 07, 2007 18:36	Cruise:	S307	Latitude:	36.043	Year:	2007
Project:	PACOOS	Station:	NPS 5	Longitude:	-123.667	Work week:	23
Platform:	RV MCARTHUR II	Cast:	25	Secchi Depth:	---	Day of Year:	158

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.7	12	13.554	32.794	24.574	83	0.679	0.088	0.277	5.975
50	49.5	11	10.699	33.015	25.284	90	12.136	0.332	1.142	13.739
100	99.8	10	9.335	33.548	25.929	91	23.024	0.066	1.672	24.728
200	200.7	9	8.138	34.021	26.487	91	30.219	0.063	1.911	37.827
300	302.1	8	7.248	34.150	26.719	91	35.463	0.034	2.380	54.227
400	403.0	7	6.150	34.167	26.880	91	38.924	0.033	2.695	68.871
500	505.0	6	5.564	34.230	27.003	91	40.857	0.039	2.958	81.352
600	604.9	5	4.987	34.273	27.106	91	42.542	0.037	3.079	92.752
700	705.9	4	4.710	34.351	27.200	91	43.266	0.045	3.208	100.35
800	806.8	3	4.427	34.398	27.269	91	43.815	0.037	3.201	106.88
900	909.7	2	4.078	34.436	27.336	91	44.119	0.029	3.149	114.55
1000	1010.1	1	3.784	34.466	27.391	91	44.213	0.025	3.264	120.83



Date Jun 07, 2007 20:45 Cruise: S307 Latitude: 36.125 Year: 2007  
 Project: PACOOS Station: 67-70 Longitude: -123.491 Work week: 23  
 Platform: RV MCARTHUR II Cast: 26 Secchi Depth: --- Day of Year: 158

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.7	12	13.034	32.982	24.823	81	3.643	0.112	0.312	8.624
5	5.3	11	13.005	32.981	24.829	81	3.973	0.123	0.279	9.234
10	10.3	10	13.001	32.982	24.830	82	3.906	0.119	0.368	9.082
20	19.4	9	12.857	32.968	24.848	82	3.713	0.139	0.247	8.333
30	29.9	8	11.803	32.882	24.981	86	5.641	0.227	0.344	7.061
40	39.2	7	11.469	32.970	25.112	90	7.296	0.214	0.524	7.606
60	60.3	6	10.028	33.107	25.470	91	14.977	0.204	0.942	14.641
80	80.2	5	9.699	33.321	25.693	91	17.537	0.141	1.235	17.015
100	99.1	4	9.248	33.607	25.990	91	23.426	0.085	1.617	25.860
150	151.3	3	8.603	33.964	26.372	91	27.242	0.069	1.915	32.435
200	201.9	2	7.733	33.982	26.517	91	30.907	0.087	2.178	39.656
1000	1010.4	1	3.772	34.469	27.395	91	44.024	0.020	3.152	121.17

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	1.226	0.283	0	100	52.161	42.542	0
5	11	1.226	0.292	5	50	85.581	69.800	5
10	10	1.208	0.293	10	30	91.802	76.000	8
20	9	1.308	0.312	10	15	84.093	69.618	13
30	8	0.654	0.270	20	5	41.433	31.681	21
40	7	0.263	0.132	30	1	5.410	8.273	34
60	6	0.057	0.105	40	0.1	0.257	0.975	65
80	5	0.020	0.046					
100	4	0.027	0.071					
150	3	0.005	0.024					
200	2	0.005	0.026					
1000	1	0.002	0.015					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	38.06	mg m-2 day -1	Carbon Fixation:	1838.6	mg m-2 day-1
Phaeophytin:	9.84	mg m-2 day -1	Productivity Index:	48.30	mg C mg Chl day-1
Mixed Layer	257	meters	PBOpt:	76.	mg C mg Chl day-1

Date	Jun 07, 2007 23:20	Cruise:	S307	Latitude:	36.209	Year:	2007
Project:	PACOOS	Station:	NPS4	Longitude:	-123.313	Work week:	23
Platform:	RV MCARTHUR II	Cast:	27	Secchi Depth:	---	Day of Year:	158

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.7	12	13.876	33.507	25.059	77	5.137	0.149	0.244	10.712
50	50.3	11	10.369	33.429	25.664	90	15.665	0.448	1.220	17.544
100	101.4	10	8.966	33.815	26.197	91	24.809	0.044	1.533	25.760
200	201.0	9	7.546	34.031	26.582	91	31.157	0.070	2.236	42.614
300	302.8	8	6.927	34.119	26.739	91	36.046	0.025	2.563	55.705
400	403.9	7	6.087	34.174	26.894	91	38.510	0.070	2.955	69.663
500	505.3	6	5.514	34.244	27.021	91	41.258	0.036	3.040	81.995
600	606.2	5	5.110	34.312	27.122	91	---	0.024	---	92.079
700	706.5	4	4.753	34.360	27.202	91	---	0.020	---	96.026
800	808.5	3	4.412	34.404	27.275	91	41.947	0.023	3.077	106.19
900	909.3	2	4.100	34.431	27.331	91	---	0.029	3.096	112.94
1000	1011.4	1	3.785	34.461	27.387	91	---	0.027	---	120.06

Date Jun 08, 2007 01:38 Cruise: S307 Latitude: 36.293 Year: 2007  
 Project: PACOOS Station: 67-65 Longitude: -123.133 Work week: 23  
 Platform: RV MCARTHUR II Cast: 28 Secchi Depth: --- Day of Year: 159

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.7	12	12.565	32.964	24.900	81	5.118	0.154	0.253	10.174
5	6.1	11	12.558	32.964	24.902	81	5.109	0.146	0.374	9.918
10	10.6	10	12.551	32.965	24.904	81	5.088	0.143	0.357	9.884
20	20.5	9	12.516	32.966	24.912	81	5.480	0.162	0.449	10.197
30	31.8	8	10.442	33.262	25.520	89	15.667	0.546	1.033	16.719
40	41.1	7	10.183	33.352	25.635	90	17.048	0.337	1.185	17.976
60	61.1	6	9.622	33.477	25.827	91	19.049	0.054	1.287	17.567
80	80.9	5	9.452	33.763	26.078	91	23.124	0.039	1.555	23.496
100	101.1	4	9.191	33.896	26.225	90	25.690	0.044	1.741	27.662
150	151.6	3	8.602	34.044	26.434	90	30.039	0.039	1.961	35.725
200	200.6	2	8.304	34.109	26.532	91	31.766	0.069	2.252	40.957
1000	1011.0	1	3.805	34.463	27.387	91	44.290	0.023	3.121	120.85

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	1.335	0.369	0	100	56.216	42.107	0
5	11	1.226	0.317	5	50	97.255	79.322	5
10	10	1.299	0.372	10	30	95.189	73.293	8
20	9	1.399	0.382	10	15	90.835	69.940	13
30	8	0.563	0.293	20	5	44.457	31.786	20
40	7	0.480	0.267	30	1	3.405	6.047	32
60	6	0.021	0.027	40	0.1	0.438	0.912	58
80	5	0.044	0.093					
100	4	0.035	0.127					
150	3	0.013	0.118					
200	2	0.007	0.089					
1000	1	0.002	0.015					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	37.94	mg m-2 day -1	Carbon Fixation:	1894.1	mg m-2 day-1
Phaeophytin:	11.32	mg m-2 day -1	Productivity Index:	49.93	mg C mg Chl day-1
Mixed Layer	---	meters	PBOpt:	79.32	mg C mg Chl day-1

Date	Jun 08, 2007 04:27	Cruise:	S307	Latitude:	36.376	Year:	2007
Project:	PACOOS	Station:	NPS 3	Longitude:	-122.954	Work week:	23
Platform:	RV MCARTHUR II	Cast:	29	Secchi Depth:	---	Day of Year:	159

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.6	12	12.869	33.322	25.119	78	5.778	0.185	0.546	8.813
50	50.6	11	9.748	33.643	25.935	90	22.526	0.064	1.508	22.794
100	100.6	10	9.147	33.910	26.243	90	27.483	0.041	1.932	30.803
200	201.9	9	7.729	34.076	26.591	91	32.724	0.092	2.278	45.351
300	302.2	8	6.906	34.135	26.754	91	---	0.060	---	49.335
400	404.1	7	6.166	34.191	26.897	91	37.696	0.042	2.819	69.817
500	503.4	6	5.570	34.236	27.008	91	38.286	0.075	2.997	77.865
600	605.8	5	5.087	34.310	27.124	91	---	0.045	---	81.043
700	706.4	4	4.770	34.360	27.200	91	42.323	0.026	3.159	101.27
800	808.5	3	4.366	34.407	27.283	91	43.140	0.040	3.238	109.85
900	909.3	2	4.071	34.438	27.339	91	---	0.034	---	113.97
1000	1008.6	1	3.815	34.463	27.386	91	43.562	0.081	3.217	122.14

Date Jun 08, 2007 06:37 Cruise: S307 Latitude: 36.459 Year: 2007  
 Project: PACOOS Station: 67-60 Longitude: -122.777 Work week: 23  
 Platform: RV MCARTHUR II Cast: 30 Secchi Depth: --- Day of Year: 159

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.2	12	12.023	33.509	25.427	83	12.366	0.369	0.707	13.789
5	6.1	11	12.023	33.509	25.427	83	12.051	0.349	0.781	13.074
10	10.2	10	12.027	33.510	25.427	84	12.406	0.364	0.841	13.070
20	20.7	9	12.017	33.506	25.426	83	9.072	0.263	0.603	9.196
30	31.0	8	10.901	33.447	25.585	87	16.177	0.426	1.026	15.601
40	40.9	7	10.211	33.452	25.709	90	17.601	0.277	1.083	17.762
60	60.6	6	9.551	33.558	25.901	90	22.473	0.090	1.452	23.288
80	81.5	5	9.179	33.770	26.128	91	22.292	0.044	1.554	23.582
100	100.2	4	8.944	33.906	26.272	91	23.526	0.055	1.591	26.290
150	151.7	3	8.441	34.030	26.448	91	29.880	0.066	2.032	37.104
200	202.0	2	7.958	34.077	26.558	91	31.742	0.101	2.126	42.961
1000	1010.2	1	3.773	34.469	27.394	91	43.488	0.042	3.132	122.04

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	1.326	0.310	0	100	77.068	58.121	0
5	11	1.262	0.247	5	50	93.968	74.435	5
10	10	1.262	0.264	10	30	91.419	72.416	8
20	9	1.326	0.277	10	15	81.778	64.779	13
30	8	0.550	0.233	20	5	44.028	33.204	21
40	7	0.225	0.178	30	1	4.043	7.345	34
60	6	0.090	0.144	40	0.1	0.335	1.486	64
80	5	0.025	0.107					
100	4	0.013	0.078					
150	3	0.008	0.115					
200	2	0.008	0.062					
1000	1	0.002	0.018					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	38.86	mg m-2 day -1	Carbon Fixation:	1938.1	mg m-2 day-1
Phaeophytin:	8.91	mg m-2 day -1	Productivity Index:	49.88	mg C mg Chl day-1
Mixed Layer	33	meters	PBOpt:	74.44	mg C mg Chl day-1

Date	Jun 08, 2007 09:17	Cruise:	S307	Latitude:	36.544	Year:	2007
Project:	PACOOS	Station:	NPS2	Longitude:	-122.601	Work week:	23
Platform:	RV MCARTHUR II	Cast:	31	Secchi Depth:	---	Day of Year:	159

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.2	12	11.786	33.822	25.715	79	11.077	0.242	0.640	14.087
50	50.8	11	9.540	33.794	26.088	90	24.480	0.208	1.621	26.061
100	101.5	10	8.834	34.001	26.364	90	28.412	0.145	1.847	34.012
200	202.0	9	7.905	34.059	26.552	91	30.363	0.057	2.030	41.290
300	302.6	8	6.939	34.123	26.740	91	35.154	0.054	2.486	56.750
400	403.1	7	6.252	34.176	26.874	91	37.135	0.074	2.822	65.858
500	504.2	6	5.636	34.234	26.998	91	40.179	0.047	2.944	82.126
600	605.7	5	5.215	34.301	27.102	91	41.100	0.031	3.020	91.228
700	706.9	4	4.827	34.354	27.190	91	41.201	0.034	3.079	97.583
800	809.1	3	4.425	34.402	27.272	91	42.824	0.043	3.134	109.13
900	908.9	2	4.084	34.439	27.338	91	43.013	0.030	3.076	116.21
1000	1010.7	1	3.854	34.465	27.383	91	40.558	0.032	3.015	113.63

Date Jun 08, 2007 11:24 Cruise: S307 Latitude: 36.628 Year: 2007  
 Project: PACOOS Station: 67-55 Longitude: -122.423 Work week: 23  
 Platform: RV MCARTHUR II Cast: 32 Secchi Depth: --- Day of Year: 159

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	0.7	12	12.143	33.479	25.381	85	11.102	0.390	0.718	12.601
5	4.9	11	12.141	33.479	25.382	85	10.386	0.349	0.747	11.267
10	10.5	10	12.153	33.479	25.379	85	10.853	0.353	0.744	12.178
20	20.6	9	11.909	33.485	25.430	86	12.018	0.398	0.863	13.210
30	30.4	8	11.634	33.518	25.507	86	13.529	0.388	0.918	14.601
40	40.0	7	11.269	33.762	25.764	84	14.133	0.273	1.076	16.898
60	60.4	6	9.436	33.893	26.182	90	25.490	0.289	1.767	30.194
80	80.6	5	9.156	33.960	26.280	90	27.373	0.260	1.872	32.222
100	101.2	4	8.943	34.018	26.360	90	28.483	0.397	1.947	35.542
150	151.2	3	8.693	34.037	26.415	90	29.431	0.194	1.928	36.782
200	202.8	2	8.256	34.093	26.526	90	31.283	0.110	2.186	42.459
1000	1010.8	1	3.855	34.466	27.384	91	42.606	0.063	3.265	122.32

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	0.917	0.202	0	100	46.365	50.545	0
5	11	0.397	0.208	5	50	61.030	153.771	6
10	10	0.393	0.189	10	30	66.067	167.999	12
20	9	0.360	0.174	10	15	59.553	151.435	19
30	8	0.288	0.139	20	5	33.515	93.186	31
40	7	0.194	0.209	30	1	11.380	39.528	51
80	5	0.100	0.282	40	0.1	1.711	8.804	79
100	4	0.060	0.314					
150	3	0.040	0.210					
200	2	0.011	0.220					
1000	1	0.003	0.020					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	20.18	mg m-2 day -1	Carbon Fixation:	2158.1	mg m-2 day-1
Phaeophytin:	9.06	mg m-2 day -1	Productivity Index:	106.97	mg C mg Chl day-1
Mixed Layer	11	meters	PBOpt:	168.	mg C mg Chl day-1

Date	Jun 08, 2007 14:08	Cruise:	S307	Latitude:	36.71	Year:	2007
Project:	PACOOS	Station:	NPS 1	Longitude:	-122.243	Work week:	23
Platform:	RV MCARTHUR II	Cast:	33	Secchi Depth:	---	Day of Year:	159

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.1	12	12.207	33.443	25.341	85	10.761	0.358	0.577	12.892
50	50.9	11	9.704	33.728	26.009	90	22.627	0.213	1.476	22.935
100	101.7	10	9.134	33.967	26.289	90	27.235	0.261	1.769	31.815
200	201.5	9	8.435	34.102	26.506	89	26.774	0.111	1.932	35.886
300	303.0	8	7.814	34.180	26.662	90	28.296	0.042	2.213	43.864
400	404.0	7	6.385	34.164	26.847	91	32.057	0.081	2.420	56.846
500	504.6	6	5.903	34.244	26.973	90	38.304	0.042	2.996	77.747
600	606.5	5	5.345	34.289	27.077	90	35.180	0.045	2.771	77.334
700	706.8	4	4.791	34.360	27.198	90	42.027	0.039	3.059	101.54
800	808.6	3	4.490	34.399	27.263	91	42.630	0.034	3.101	108.56
900	909.1	2	4.109	34.439	27.335	90	42.570	0.038	3.107	117.45
1000	1010.5	1	3.889	34.460	27.375	90	42.671	0.042	3.158	122.87



Date Jun 08, 2007 16:24 Cruise: S307 Latitude: 36.735 Year: 2007  
 Project: PACOOS Station: H3 Longitude: -122.018 Work week: 23  
 Platform: RV MCARTHUR II Cast: 34 Secchi Depth: --- Day of Year: 159

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.7	12	10.828	33.853	25.913	84	17.941	0.266	0.922	21.899
5	5.9	11	10.570	33.877	25.977	85	18.190	0.265	1.262	22.471
10	10.9	10	10.416	33.905	26.026	86	19.712	0.262	1.365	25.253
20	21.0	9	10.336	33.909	26.043	87	20.161	0.268	1.491	25.845
30	30.6	8	10.202	33.907	26.065	87	20.962	0.275	1.629	26.603
40	41.0	7	9.947	33.902	26.104	87	22.337	0.269	1.775	27.708
60	60.9	6	9.247	33.953	26.259	89	26.110	0.302	1.996	32.927
80	81.4	5	8.965	33.981	26.327	88	27.962	0.325	1.985	36.211
100	101.0	4	8.869	34.001	26.358	89	28.593	0.327	1.993	35.820
150	152.0	3	8.437	34.068	26.479	90	29.636	0.267	2.134	39.629
200	201.7	2	8.010	34.126	26.589	90	32.225	0.079	2.401	45.767
1000	1009.6	1	3.881	34.454	27.371	87	42.089	0.073	3.110	123.60

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAE0 (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	2.625	0.784	0	100	153.983	58.666	0
5	11	2.697	0.542	5	50	138.790	51.453	3
10	10	1.980	0.598	10	30	74.649	37.703	6
20	9	1.435	0.481	10	15	65.268	32.965	10
30	8	1.072	0.539	20	5	24.706	17.217	16
40	7	0.754	0.671	30	1	4.216	3.934	26
60	6	0.134	0.479	40	0.1	0.301	0.399	42
80	5	0.141	0.560					
100	4	0.106	0.327					
150	3	0.072	0.365					
200	2	0.043	0.341					
1000	1	0.016	0.134					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	45.75	mg m-2 day -1	Carbon Fixation:	1462.2	mg m-2 day-1
Phaeophytin:	14.45	mg m-2 day -1	Productivity Index:	31.96	mg C mg Chl day-1
Mixed Layer	483	meters	PBOpt:	58.67	mg C mg Chl day-1

Date Jun 08, 2007 18:47 Cruise: S307 Latitude: 36.797 Year: 2007  
 Project: PACOOS Station: C1 Longitude: -121.847 Work week: 23  
 Platform: RV MCARTHUR II Cast: 35 Secchi Depth: --- Day of Year: 159

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.3	12	12.606	33.853	25.582	71	5.290	0.227	0.305	11.625
5	5.4	11	12.598	33.851	25.582	70	5.665	0.231	0.444	11.528
10	10.3	10	12.120	33.848	25.672	69	7.315	0.257	0.478	12.114
20	20.1	9	11.364	33.838	25.805	80	14.676	0.242	0.940	18.718
30	30.1	8	9.995	33.849	26.055	89	20.664	0.264	1.549	25.716
40	39.8	7	9.441	33.931	26.210	87	21.249	0.278	1.732	29.398
60	59.8	6	9.196	33.965	26.278	86	22.197	0.294	1.816	31.053
80	80.5	5	9.053	33.993	26.322	88	27.465	0.336	1.876	35.453
100	101.0	4	8.846	34.024	26.380	88	28.360	0.335	2.121	39.448
150	151.5	3	8.419	34.076	26.487	89	---	---	---	---
200	201.3	2	7.994	34.117	26.584	85	32.195	0.341	2.449	50.969
225	226.2	1	7.795	34.136	26.628	85	32.855	0.324	2.648	52.980

### Biological

DEP (m)	BTL #	CHL (mg m-3 d-1)	PHAEO (mg m-3 d-1)	DEP (m)	% S. I.	CARBON (mg m-3 d-1)	PROD INDEX carbon/chl (mg m-3 d-1)	LIGHT DEPTH (m)
0	12	9.082	1.517	0	100	215.901	23.772	0
5	11	9.445	1.493	0	50	329.250	36.252	2
10	10	10.717	1.917	5	30	289.643	30.665	4
20	9	5.622	1.594	5	15	233.921	24.766	6
30	8	0.645	0.754	10	5	101.870	9.506	9
40	7	0.309	0.658	20	1	14.946	2.659	14
60	6	0.200	0.699	20	0.1	1.248	0.222	21
80	5	0.126	0.444					
100	4	0.094	0.338					
150	3	0.062	0.210					
200	2	0.055	0.223					
225	1	0.045	0.227					

### Integrated Value

Integrated values are 1.0% of Surface Intensity (S.I.)

Chlorophyll <i>a</i> :	124.07	mg m-2 day -1	Carbon Fixation:	2388.5	mg m-2 day-1
Phaeophytin:	22.46	mg m-2 day -1	Productivity Index:	19.25	mg C mg Chl day-1
Mixed Layer	---	meters	PBOpt:	36.25	mg C mg Chl day-1

Date	Jun 08, 2007 22:14	Cruise:	S307	Latitude:	36.737	Year:	2007
Project:	PACOOS	Station:	H3	Longitude:	-122.019	Work week:	23
Platform:	RV MCARTHUR II	Cast:	36	Secchi Depth:	---	Day of Year:	159

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.4	12	10.911	33.640	25.733	88	19.503	0.281	1.087	20.445
50	50.2	11	10.114	33.910	26.082	88	21.853	0.273	1.559	27.880
100	101.2	10	8.922	33.992	26.343	88	28.347	0.339	1.980	36.629
200	201.7	9	8.001	34.126	26.590	90	32.455	0.066	2.232	46.436
300	302.2	8	7.056	34.159	26.753	90	35.260	0.048	2.408	57.953
400	402.4	7	6.241	34.226	26.914	90	38.149	0.086	2.848	73.101
500	502.7	6	5.744	34.260	27.005	90	39.556	0.076	2.962	82.972
600	604.6	5	5.144	34.318	27.123	89	41.118	0.063	3.095	95.443
700	705.6	4	4.708	34.369	27.215	89	41.954	0.049	3.064	104.84
800	807.9	3	4.482	34.395	27.261	89	42.122	0.042	3.101	110.33
900	909.8	2	4.100	34.433	27.332	88	42.107	0.056	3.164	118.81
1000	1009.1	1	3.974	34.445	27.355	88	42.377	0.080	3.211	120.67

Date Jun 09, 2007 03:15 Cruise: S307 Latitude: 36.955 Year: 2007  
 Project: PACOOS Station: 65.5-52.5 Longitude: -122.419 Work week: 23  
 Platform: RV MCARTHUR II Cast: 37 Secchi Depth: --- Day of Year: 160

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	1.3	12	12.038	33.542	25.449	81	12.024	0.367	0.653	13.892
5	5.4	11	12.016	33.542	25.454	82	11.975	0.375	0.789	13.721
10	10.5	10	12.008	33.541	25.455	82	11.977	0.352	0.724	13.775
20	20.9	9	12.004	33.538	25.453	82	12.354	0.387	0.825	13.921
30	30.6	8	10.860	33.553	25.674	89	16.844	0.577	1.163	18.092
40	41.3	7	10.318	33.601	25.807	90	20.600	0.423	1.303	20.818
60	61.5	6	9.422	33.679	26.017	90	23.991	0.055	1.527	25.249
80	81.3	5	9.623	33.894	26.153	90	23.678	0.093	1.646	26.548
100	101.3	4	9.221	33.932	26.248	90	27.181	0.053	1.861	31.226
150	151.8	3	8.554	34.043	26.441	90	29.872	0.093	2.056	37.701
200	203.3	2	8.108	34.106	26.558	90	31.736	0.071	2.246	44.319
270	272.9	1	7.417	34.153	26.697	89	33.979	0.085	2.497	53.126

Date Jun 09, 2007 06:36 Cruise: S307 Latitude: 37.257 Year: 2007  
 Project: PACOOS Station: 63.5-52.5 Longitude: -122.631 Work week: 23  
 Platform: RV MCARTHUR II Cast: 38 Secchi Depth: --- Day of Year: 160

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	0.4	12	11.842	33.869	25.740	78	---	---	---	---
5	5.3	11	11.770	33.866	25.752	79	9.471	0.252	1.023	10.801
10	10.8	10	11.091	33.860	25.871	85	12.612	0.279	1.275	14.428
20	20.7	9	10.075	33.845	26.038	89	21.660	0.407	1.537	24.675
30	30.6	8	9.374	33.895	26.193	90	25.681	0.325	2.046	30.826
40	40.7	7	9.064	33.942	26.280	90	26.707	0.310	2.066	34.515
60	61.0	6	8.871	33.975	26.337	90	27.935	0.295	2.155	38.955
80	81.3	5	8.627	34.029	26.418	86	28.724	0.337	2.391	47.320
90	88.9	4	8.629	34.029	26.418	86	29.242	0.344	2.521	48.480
90	88.2	3	8.629	34.030	26.418	86	---	---	---	---
90	89.1	2	8.629	34.030	26.418	86	---	---	---	---
90	89.1	1	8.629	34.029	26.418	86	---	---	---	---

Date	Jun 09, 2007 10:17	Cruise:	S307	Latitude:	37.558	Year:	2007
Project:	PACOOS	Station:	61.75-52.5	Longitude:	-122.841	Work week:	23
Platform:	RV MCARTHUR II	Cast:	39	Secchi Depth:	---	Day of Year:	160

\* Note: Latitude and Longitude are reported in decimal degrees. '---' signifies no data.

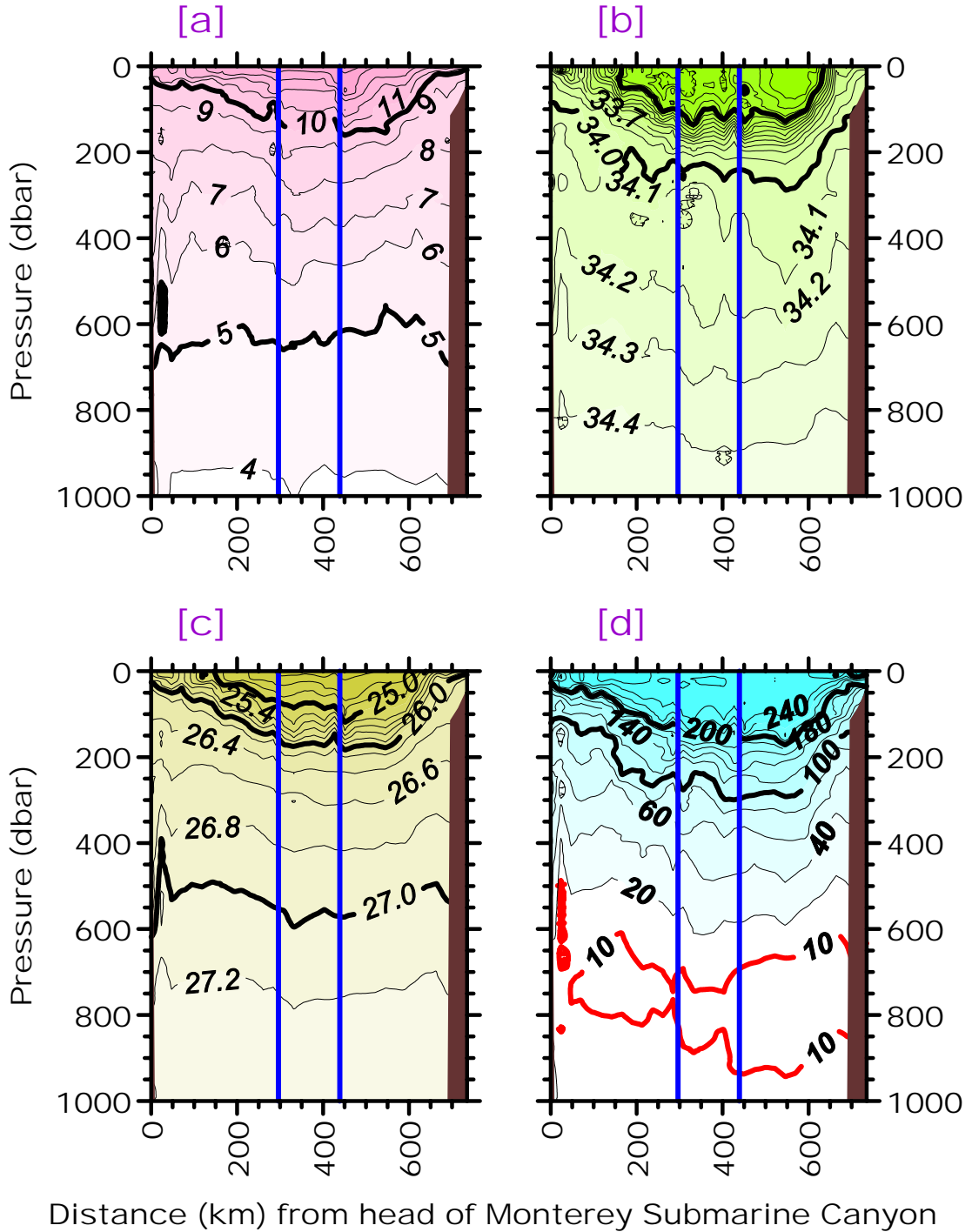
### Physical and Chemical

DEP (m)	PRESS (db)	BTL #	TEMP (°C)	SAL (psu)	SIGMA T	TRANSMISS (%)	NO3 (μM)	NO2 (μM)	PO4 (μM)	SIO4 (μM)
0	2.7	12	11.767	33.636	25.573	85	8.659	0.228	0.578	12.055
5	5.3	11	11.761	33.635	25.574	84	8.597	0.243	0.773	12.090
10	10.3	10	11.759	33.636	25.575	85	8.291	0.227	0.772	11.861
20	20.6	9	10.821	33.735	25.823	87	9.854	0.240	0.934	13.445
30	30.6	8	9.523	33.869	26.149	90	20.427	0.361	1.786	25.453
40	40.6	7	8.948	33.928	26.288	90	23.722	0.349	2.254	34.861
60	61.0	6	8.596	34.012	26.409	89	29.499	0.286	2.193	39.889
75	76.9	5	8.567	34.017	26.417	88	29.404	0.287	2.248	41.384
75	77.1	3	8.566	34.017	26.418	88	---	---	---	---
75	77.7	2	8.567	34.017	26.417	88	---	---	---	---
80	78.4	4	8.567	34.017	26.417	88	---	---	---	---
80	78.5	1	8.567	34.017	26.417	88	---	---	---	---

**Table A4:** *Marine Mammal Observations.* This table lists the results of the marine mammal observations made during the PaCOOS cruise of June 2007. The data are listed by species code, then chronologically within each species code.

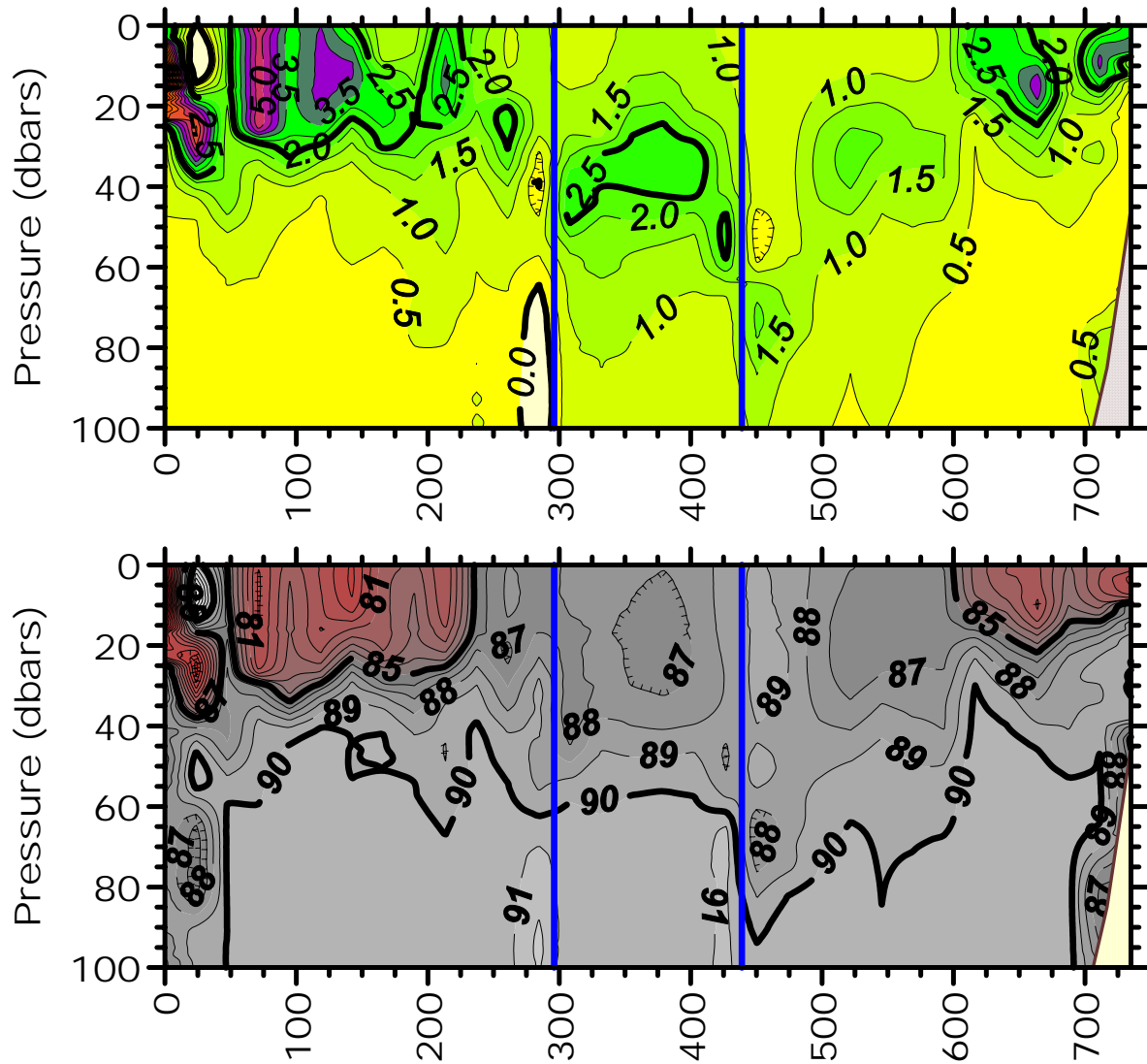
Species Code	Scientific ( <i>Common</i> ) Name	Size of Group	Date of Sighting (mm/dd/yyyy)	Latitude (°N)	Longitude (°W)
21	Grampus griseus ( <i>Risso's Dolphin</i> )	260	6/08/2007	36.720	122.076
		475		36.730	122.040
		10		36.780	121.990
		18		36.596	122.373
22	Lagenorhynchus obliquidens ( <i>Pacific White-Sided Dolphin</i> )	5	6/08/2007	36.553	122.201
		20		36.646	122.244
		8		36.996	122.192
		7		37.024	122.243
		10		37.035	122.265
		8		36.950	122.410
27	Lissodelphis borealis ( <i>Northern Right Whale Dolphin</i> )	25	6/08/2007	36.720	122.073
		75		36.730	122.048
40	Phocoena phocoena ( <i>Harbor Porpoise</i> )	6	6/04/2007	37.920	122.930
		5		37.918	122.929
		3		37.920	122.920
44	Phocoenoides dalli ( <i>Dall's Porpoise</i> )	7	6/04/2007	37.871	123.047
		8		37.866	123.047
69	Eschrihtius robustus ( <i>Gray Whale</i> )	1	6/04/2007	37.819	122.479
74	Balaenoptera physalus ( <i>Fin Whale</i> )	1	6/06/2007	36.030	125.342
		1		36.049	125.325

Species Code	Scientific ( <i>Common</i> ) Name	Size of Group	Date of Sighting (mm/dd/yyyy)	Latitude (°N)	Longitude (°W)
76	Megaptera novaeangliae ( <i>Humpback Whale</i> )	1	6/04/2007	37.952	122.875
		2		37.916	122.930
		1		37.890	123.000
		2		37.896	123.002
		2		37.840	123.104
		2		37.840	123.090
		3		37.802	123.191
		3	6/08/2007	36.787	122.019
		2		36.772	121.967
		2		36.773	121.891
		1		36.799	121.881
		2		36.802	121.856
		1		36.802	121.856
		1		36.790	121.867
		2		36.785	121.858
		1		36.720	121.874
		1		36.695	121.873
		1		36.687	121.873
		3		36.689	121.857
		1		36.721	121.922
		1		36.700	121.922
		2		36.729	122.002
		2		36.719	122.002
		1		36.724	121.987
		1		36.746	122.049
		1		36.716	122.026
		2		36.757	122.110
		1		36.777	122.141
		1		37.035	122.265
77	Unidentified Dolphin	15	6/05/2007	37.102	124.755
		30	6/08/2007	36.854	122.006
CU	Callorhinus ursinus ( <i>Northern Fur Seal</i> )	2	6/04/2007	37.789	123.230
MA	Mirounga angustirostris ( <i>Elephant Seal</i> )	1	6/08/2007	36.720	122.100
PV	Phoca vitulina ( <i>Harbor Seal</i> )	1	6/04/2007	37.920	122.920
		1		37.860	123.061
		1		37.830	123.130



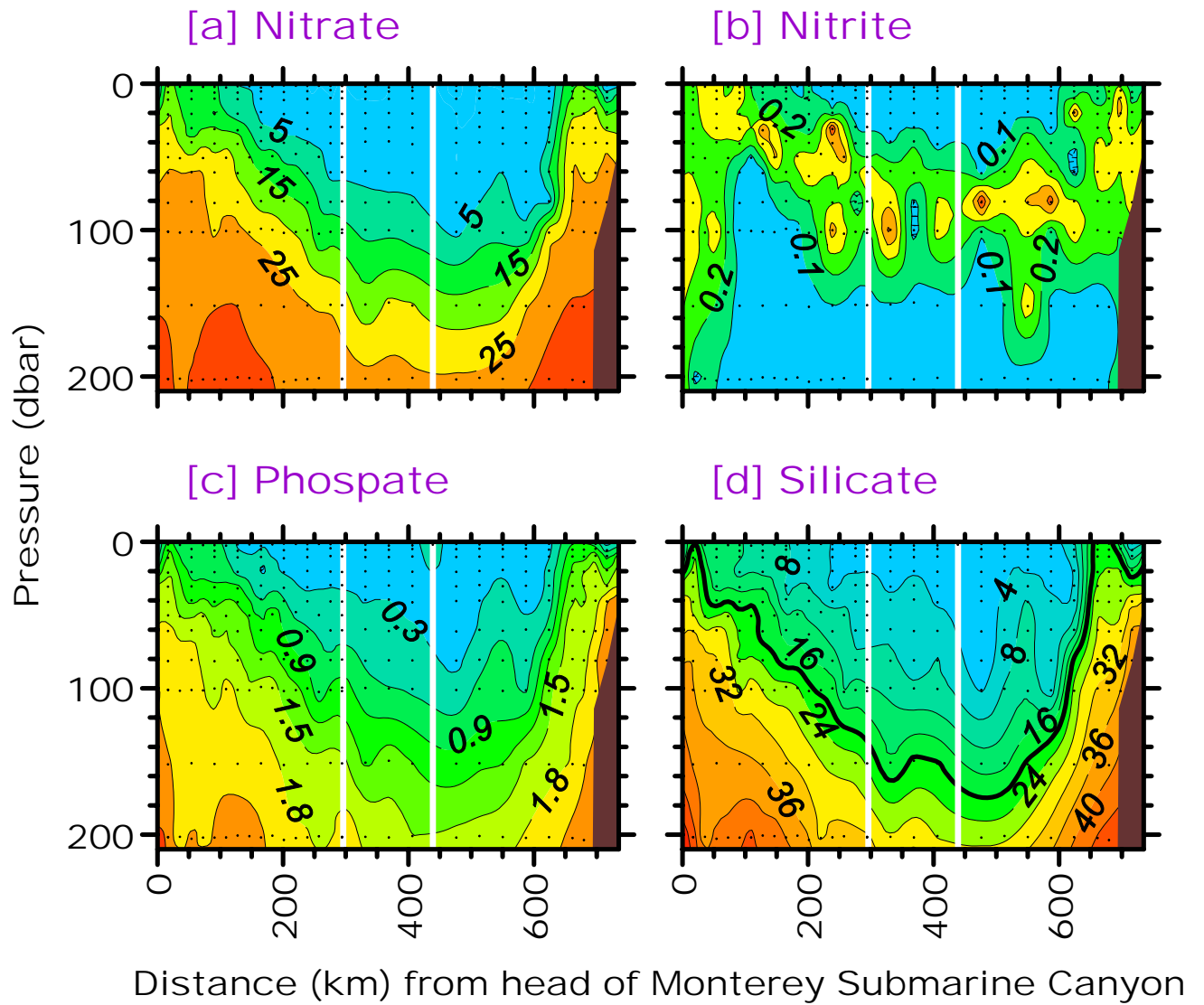
**Figure 6:** Contours of (a) temperature ( $^{\circ}\text{C}$ ), (b) salinity, (c) density anomaly ( $\text{kg m}^{-3}$ ), and (d) oxygen ( $\mu\text{m kg}^{-1}$ ) fields along the line of hydrographic stations from Moss Landing (on the left) to Point Reyes, California. The blue lines indicate the locations of the corner hydrographic stations (CTDs 11/12/13 and 17/18). Contour intervals for panels a-d are  $1^{\circ}\text{C}$ , 0.1,  $0.2 \text{ kg m}^{-3}$ , and  $20 \mu\text{m kg}^{-1}$ , respectively, except that the (nearly) oxygen minimum contour of  $10 \mu\text{m kg}^{-1}$  is highlighted in red in panel d.



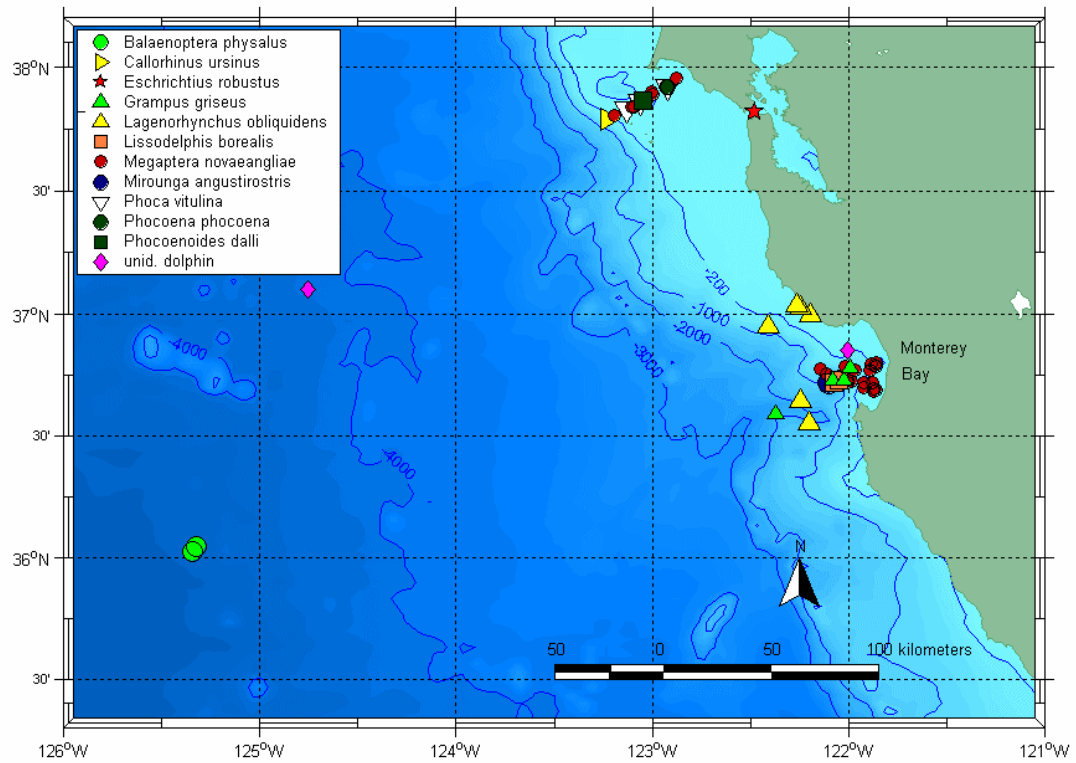


Distance (km) from head of Monterey Submarine Canyon (CTD35)

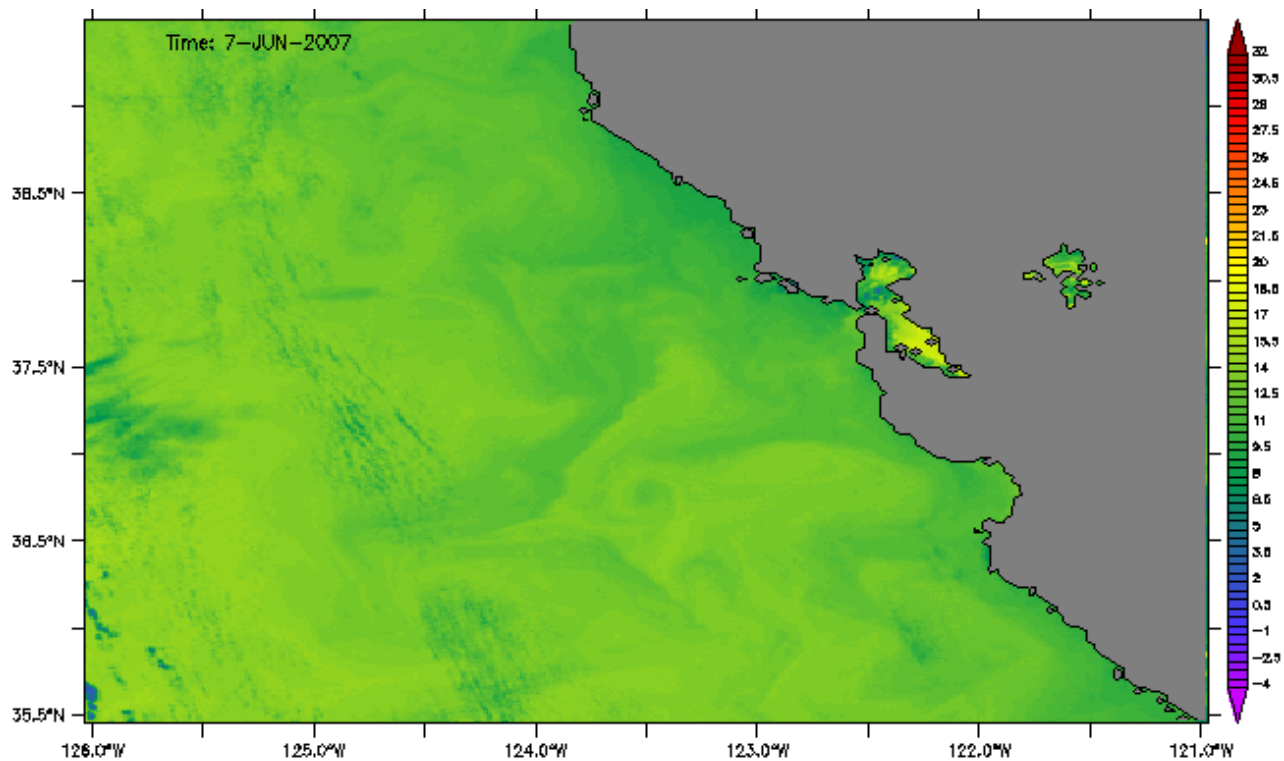
**Figure 7:** Contours of fluorescence (volts) [upper panel] and transmissivity (percentage) [lower panel] in the upper 100 dbars of the water column along the line of hydrographic stations from Moss Landing (on the left) to Point Reyes, California. The blue lines indicate the locations of the corner hydrographic stations (CTDs 11/12/13 and 17/18). The contour intervals are 0.5 volt and 1 percent, respectively, for the upper and lower panels. Closed contours are hatched if values are decreasing within the contour.



**Figure 8:** Contours of (a) nitrate ( $\mu\text{m}$ ), (b) nitrite ( $\mu\text{m}$ ), (c) phosphate ( $\mu\text{m}$ ), and (d) silicate ( $\mu\text{m}$ ) fields along the line of hydrographic stations from Moss Landing (on the left) to Point Reyes, California. The white lines indicate the locations of the corner hydrographic stations (CTDs 11/12/13 and 17/18). The dots indicate the water sample locations. Contour intervals for panels a-d are 5  $\mu\text{m}$ , 0.1  $\mu\text{m}$ , 0.3  $\mu\text{m}$ , and 4  $\mu\text{m}$ , respectively.



**Figure 9:** *Locations of sightings of all marine mammals during the PaCOOS cruise of June 2007.*



**Figure 10:** *AVHRR (Advanced Very High Resolution Radiometer) satellite image of sea surface temperature ( $^{\circ}\text{C}$ ) of the area of operation during the PaCOOS cruise of June 2007. The image was taken on 7 June 2007 at 1005 UT.*

## INITIAL DISTRIBUTION LIST

- |     |  |   |
|-----|--|---|
| 1.  | Defense Technical Information Center<br>8725 John J. Kingman Rd., STE 0944<br>Ft. Belvoir, VA 22060-6218 | 2 |
| 2.  | Dudley Knox Library, Code 013<br>Naval Postgraduate School<br>Monterey, CA 93943-5100                    | 2 |
| 3.  | Reiko Michisaki<br>Monterey Bay Aquarium Research Institute<br>Moss Landing, CA                          | 1 |
| 4.  | Baldo Marinovic<br>Long Marine Laboratory<br>University of California<br>Santa Cruz, CA                  | 1 |
| 5.  | Marguerite Blum<br>Monterey Bay Aquarium Research Institute<br>Moss Landing, CA                          | 1 |
| 6.  | Katherine Whitaker<br>Pacific Grove, CA  | 1 |
| 7.  | Steven Bograd<br>NOAA<br>Pacific Grove, CA   | 1 |
| 8.  | Arnold Mantyla<br>University of California<br>San Diego, CA  | 1 |
| 9.  | Teri Chereskin<br>University of California<br>San Diego, CA  | 1 |
| 10. | Elizabeth Venrick<br>University of California<br>San Diego, CA   | 1 |
| 11. | Bill Peterson<br>NOAA<br>Newport, OR   | 1 |
| 12. | Ralf Goericke<br>University of California<br>San Diego, CA   | 1 |

13.	Moss Landing Marine Laboratories Library Moss Landing, CA	1
14.	Erika McPhee Shaw Moss Landing Marine Laboratories Moss Landing, CA	1
15.	Frank Schwing NOAA Pacific Grove, CA	1
16.	Reginaldo Durazo Universidad Autonoma de Baja California Ensenada, Mexico	1
17.	Libe Washburn University of California Santa Barbara, CA	1
18.	Paul Choboter CalPoly State University San Luis Obispo, CA	1
19.	Roger Hewitt NOAA La Jolla, CA	1
20.	Carmen G. Castro Consejo Superior de Investigaciones Científicas Spain	1
21.	Newell Garfield San Francisco State University San Francisco, CA	1
22.	Francisco Chavez Monterey Bay Aquarium Research Institute Moss Landing, CA	1
23.	Tim Pennington Monterey Bay Aquarium Research Institute Moss Landing, CA	1
24.	Mary Batteen Naval Postgraduate School Monterey, CA	1
25.	MIDN Troy A. Benbow United States Naval Academy Annapolis, MD	1

- |     |   |   |
|-----|---|---|
| 26. | MIDN Charlotte A. Hill<br>United States Naval Academy<br>Annapolis, MD  | 1 |
| 27. | Turtle Haste<br>c/o Teacher At Sea Program<br>NOAA<br>Silver Spring, MD | 1 |
| 28. | Elsa Stuber<br>c/o Teacher At Sea Program<br>NOAA<br>Silver Spring, MD  | 1 |